FIRST

ANNUAL REPORT

OF THE

SANITARY COMMISSIONER FOR BENGAL,

FOR 1868.

WITH SELECTED EXTRACTS
FROM FORTY DISTRICT REPORTS; SPECIAL
REMARKS ON THESE; GENERAL OBSERVATIONS REGARDING
SANITATION IN BENGAL; APPENDICES,
&c. &c.

Calcutta:
PRINTED BY WILLIAM JONES, AT THE ALIPORE JAIL PRESS.

1869.

PREFATORY NOTE.

The following Report consists of four Parts—with Appendices.

Part I.—Is a general outline of Sanitary Administration in Bengal; and of work done during the year under review.

Part II.—Consists of extracts, carefully selected and edited, from forty District Reports sent in by Civil Surgeons.

Part III.—Contains special remarks on the forty Reports received.

Part IV.—Is a brief review of topics of general sanitary interest throughout the country.

The Appendices are seven in number:

The 1st and 2nd relate to the duties of Sanitary Commissioners; the 3rd points to the necessity of sanitary co-operation on the part of Civil Surgeons; the 4th gives the sanitary questions issued to all Civil Surgeons, upon which the forty reports were written; the 5th comprises conservancy rules for villages; the 6th relates to a uniform system of statistical registration; the 7th contains remarks on the chief sanitary requirements of Bengal.

D. B. S.

FROM

DAVID B. SMITH, M. D.,

Sanitary Commissioner for Bengal,

TO

THE HON'BLE A. EDEN,

Secretary to the Government of Bengal, in the
Judicial Department.

Colgong, September 29th 1869.

SIR,

I HAVE the honor to transmit, for the information of His Honor the Lieutenant-Governor of Bengal, the accompanying general Sanitary Report of the Lower Provinces of the Bengal Presidency, for the year 1868—a record of the public health of the people of Bengal, Behar, and Orissa.

In doing so, I beg to make a few remarks :—The report is of great length ; yet I venture to state that nothing is now submitted to the Government which is not of real practical importance in its bearings on the welfare of the people of this country.

It is impossible within narrow limits truly to represent the physical condition of thirty millions of human beings, whose sanitary interests involve questions of very wide scientific range.

Never before, I think I may safely say, has it been attempted in a single report, to display *in detail* the sanitary evils and requirements of all the different districts comprised under the Lieutenant-Governorship of Bengal (Assam and Sylhet excluded). In the following pages this task has in a manner been undertaken. A mass of authentic and sound scientific evidence has been collected on the subjects of Medical topography, prevailing causes of sickness and death, climatology, local causes of malaria, conservancy, water-supply, pilgrimage and epidemics, which is well worthy of permanent record.

I am aware that this evidence is not so precise or in some respects so satisfactory as could be wished ; yet it is undoubtedly of much value, as showing what exists at present, and what is wanted in the future.

A general sanitary survey and reconnaisance has been made of the country, which forcibly indicates what should be done and what should be prohibited hereafter. Herein perhaps lies the chief value of the accompanying report.

In future the form of questions issued to Civil Surgeons need not be so long—except for those who have not sent in reports this year. The information to be communicated to Government in subsequent years will be more condensed, and so generalizations will become easier and more valuable. At present we are merely entering on the stage of enquiry as to the condition of places and people, the results of which enquiry will no doubt hereafter be brought to bear on special questions of broad and practical reform. The subject must of necessity develope gradually. The seeds of sanitary reform, in all countries, are of slow growth. Yet it is most certain, as stated in a letter (No. 1044, dated 29th February 1864) from the Secretary to the Government of India, Military Department, to the President of the Sanitary Commission of Bengal, that "every step wisely taken towards the improvement of the public health will be a step towards better civilization and better government."

It is the collection, record, and analysis of facts, opinions, and statistics which furnish the best foundation to sanitary knowledge and experience. The first object of the following report has been to make a careful collection of such indispensable facts.

With much regret I feel that my part of this work has been accomplished in a manner most open to criticism. I have, however, done my best to bring before the Government what appears to me information of true value to the material interests of the people of Bengal; and I cannot here refrain from warmly expressing my obligation to Civil Surgeons, and to Civil Officers generally, for the assistance which they have given me, in a spirit of zeal and earnestness worthy of the good cause in which they have worked.

I am sanguine that this same spirit of keen and noble devotion to the interests of humanity will, in the course of a few years, produce results conspicuously beneficial to the people of India and most pleasing to the Government of the country.

In explanation of the great delay which has occurred in the submission of this report, I beg to remark that, this being the first year of my work in the sanitary department, I have experienced many difficulties in its performance.

The mass of the Civil Surgeons' reports were not received till March and April, at the very time when I was on special duty in the fever tracts of the Hooghly, Nuddea, and Jessore districts; many of them did not come in till May, and some of them even later still. To have published extracts of, and remarks on, a few of the reports, would have been to set forth and to draw inferences from a very imperfect and comparatively useless record. As they now appear, they present a mass of valuable information, consistent as a whole, yet systematized as much as possible, in points of detail, for purposes of reliable comparison. In June and July, I was, as His Honor the Lieutenant-Governor is aware, obliged to take partial rest from work, on account of ill-health ; and during the last two months I have been on a tour of personal inspection and enquiry through the Districts of North-Eastern Bengal. Again the originals of many of the reports received were very illegible and written on both sides of the paper. This in itself gave rise to much inconvenience, trouble, and delay. Most of them required, for the purposes of this report, to be carefully edited, and as they were very lengthy, the labour involved was by no means light. Anxious to bring forward as much as possible of practical interest, and at the same time to do justice to those who have worked most creditably in a somewhat new field, I have, whilst condensing the matter before me, endeavoured to let nothing of value lapse.

Considering the vast and profound range of the subject of the accompanying report, and the arduous study which in many directions it involves, I trust His Honor the Lieutenant-Governor will be kind enough to make allowance for the very imperfect and tardy manner in which I am fully aware it has been accomplished. In future the work will be easier, and I shall take care to endeavour hereafter to expedite it to the utmost.

I have the honor to be,
SIR,
Your most obedient Servant,
DAVID B. SMITH, M. D.,
Sanitary Commissioner for Bengal.

Part I.

GENERAL REPORT

OF

SANITARY ADMINISTRATION & INSPECTION &c.

Part V.

APPENDICES.

APPENDIX A.

ON THE DUTIES OF SANITARY COMMISSIONERS.

In accordance with instructions lately received from His Honor the Lieutenant-Governor, I have the honor to submit the following remarks relative to the subject-matter of a letter No. $\frac{2}{681}$, dated Fort William, 12th February 1868, from the Secretary to the Government of India, to the Secretary to the Government of Bengal.

2. That letter conveys, in general terms, the views of the Governor General in Council regarding the duties that should fall to the lately appointed Sanitary Commissioners in India and the broad principles upon which such duties should be conducted.

3. In the 2nd paragraph of the letter under consideration, the opinion of the Government of Bengal is invited, on those proposals of the Government of India which indicate the limits of the sanitary scheme shortly to be brought into operation throughout the Bengal Provinces, and indeed over the length and breadth of the Bengal Presidency.

4. His Honor the Lieutenant-Governor, before expressing his views on the subject, has directed me to report, for his information, on the manner in which, and the extent to which, effect may best be given to the measures enumerated in the letter under consideration; also as to the means and appliances that are likely to be required for the satisfactory fulfilment of the new sanitary scheme.

I am further directed to express my opinions on the proposed scope of the functions of the Sanitary Commissioner; on the likelihood or otherwise of his being able to fulfil the expectations laid down in the letter of the Secretary to the Government of India; and lastly, to point out the conditions and results involved, if the proposed scheme is to be carried out in its entirety.

5. On these different points I have the honor to submit my opinions.

6. The following is an outline of the proposed duties of each of the lately appointed Sanitary Commissioners, as contemplated in the letter of the Secretary to Government.

(*a.*) To ascertain, as exactly as possible, the existing sanitary state of the country.

(*b.*) To suggest measures for its improvement.

(*c.*) To spend a considerable portion of his time, at all seasons, in travelling over the districts under his charge.

(*d.*) To proceed, without delay, wherever local emergencies may require his presence.

(*e.*) To advise the local Government on all questions affecting public health.

(*f.*) To advise local Boards of Health, Municipalities, and other public bodies.

(*g.*) To collect information as to the unusual prevalence of any particular disease or diseases in any locality.

(*h.*) To suggest measures for their removal.

(*i.*) To proceed to the spot of any unusual visitation; to endeavour to trace out its source, and to aid in carrying out measures to arrest it.

(*j.*) Minutely to examine all localities in which cholera, fevers, and similar diseases are endemic, and to suggest measures for removing them.

(*k.*) To keep a watch over the food supplies of the country, and to take early note of any anticipated deficiencies in the agricultural out-turn.

(*l.*) To prepare, from personal observation, aided by information derived from the records and the personal observations of Civil Surgeons and others, a Medical Topography of the country.

(*m.*) To organize, with the aid of local Civil Officers, Civil Surgeons, Sub-Assistant Surgeons, and Native Doctors, a system of Registration of births, deaths and marriages—after the plan of procedure adopted by the Registrar-General of England.

(*n.*) To visit and report on the sanitary condition of jails, dispensaries and hospitals—as well as all other public institutions.

(*o.*) To report on the results of vaccination in the districts.

(*p.*) To furnish full and early information of all sanitary proceedings.

(*q.*) To prepare a carefully digested report of sanitary proceedings, quarterly—for submission to the local Government, within a month of the close of each quarter.

(*r.*) To see that all action taken with respect to sanitary arrangements in India should harmonize, as much as possible, with the system at work in England, "which is the most complete and perfect in existence, and which is being gradually adopted by every civilized nation"

(*s.*) To assimilate all Indian reports and returns to those of the rest of the world, "so that their absolute and relative value may be subjected to the test of universal criticism and comparison."

7. Such are the proposed duties as sketched in the letter from the Government of India ; and it is to be observed that "the Governor-General in Council believes that the necessary Office Establishment for carrying on the duties of the Sanitary Commissioner need not at present entail any large expenditure."

8. Without wishing to urge a single unreasonable objection to the most important sanitary undertaking of which the above is but an outline—being, on the contrary, truly anxious to regard the matter in anything but a partial and contracted light—and being, further, keenly desirous of carrying out, to the utmost, the intentions of the Government of India, with regard to the hygienic interests of the people of Bengal, I yet deem it to be my duty to express clearly and unequivocally wherein the general scheme appears to me to be likely to fall short of ultimate fulfilment ; and to indicate to what degree we may be able, approximately, to define the limits of probable achievement.

9. I am fully persuaded that no single servant of Government, however zealous and indefatigable as a Health Officer, is capable of doing anything like justice to a scheme so comprehensive and vast as that now recommended for accomplishment; the less so as he is to work with an establishment which is to entail but little expenditure.

10. The carrying out of such a plan, and the great public trust which it involves cannot, I conceive, be judiciously or fairly imposed upon one man, be the degree of his ambition or zeal what it may.

11. I have given the subject very careful consideration, and the more I reflect on it the more overpowered is my mind by the impression of the almost boundless scope of duty which it seems the Government of India has contemplated assigning to this appointment.

12. With all deference I would submit that no Indian sanitary scheme should be undertaken which is, of necessity, liable to be accomplished in an inadequate and perfunctory manner; a result the very reverse of that always observable in the English system, which the Government of India properly regards as a suitable standard of imitation.

13. It should be borne in mind that an almost infinite sub-division of labour and the employment of enormous special agencies are the real secrets of success in matters sanitary throughout Great Britain.

There we find not only a special medical adviser to the Privy Council, (occupying somewhat of the relative position, to the State, of the Sanitary Commissioners in India) but a separate Registrar-General. Both of them men in command of vast resources and of most carefully organized establishments. There we find Health of Towns Commissions; Parochial Committees on Public Hygiene; a Medical Officer of Health, appointed by law, in each district of London; Sanitary Inspectors in abundance; Local Boards of Health with efficient staff; Associations for improving towns and the dwellings of the working classes; Commissioners of Sewers and of Nuisances; Societies for the proper regulation of burials; Health Wardens; Medical Missionaries; skilled Chemists and Scientific and Medical experts voluntarily giving up their time to gratuitous labours in the cause of public health; Associations of Science; Statistical and Epidemiological Societies, and National Sanitary Conventions lending their collateral assistance, headed by influential social reformers and politicians well known to the world.

Such is, in rough outline, the enormous agency at constant work in England, exercising its scrutiny and ever-watchful care over public health, incessantly suggesting needed remedies and carrying out practical measures of prevention.

14. I hope I am not insensible to the paramount importance of similar proceedings in India. I certainly am ready to engage in such labours with strenuous and persistent effort, and with a deep and single-hearted desire to improve the condition and to enhance, even though it should be in but a small degree, the physical well-being of the large communities of Bengal, Behar and Orissa—tracts of country lying within my official jurisdiction, and presenting an area of some 220,000 square miles, divided into ten Commissionerships and forty-seven Districts, and inhabited by a population of upwards of thirty million of souls.

15. At the same time it seems to me but right to observe that, judging calmly and deliberately, the Indian Sanitary scheme now under

consideration is so perfectly gigantic in scale that it is likely to be, with the means that are at present available, but most imperfectly carried out; and that it will, under existing circumstances, be impossible to make it harmonize with European standards except in a very remote degree.

I wish I could regard the subject differently; but I am not so sanguine as to anticipate that I can, under the conditions indicated, bring about the contemplated results—most desirable and much needed as they undoubtedly are.

In justice to the cause of official and scientific accuracy I presume to remark that such expectations appear to me to be based rather on the broad hope that the greatest possible good may be accomplished with the least conceivable difficulty than on the less pleasing but more certain experiences of the past.

16. There are many branches of the great subject of Sanitary Science which cannot adequately be taken up and worked by one mind. The field is too vast; it must be sub-divided; else Sanitarians cannot reasonably expect ultimately to meet with the approval of the Government, of the public or of the medical profession.

17. I would beg to suggest that the idea of the whole plan, as it is presented in the letter of the Secretary to the Government of India, should be modified, and the work undertaken upon a system of greater sub-division of labour.

Nothing short of this will, in my opinion, insure the furtherance of the grand object in view. Meanwhile I presume to indicate what I think ought to be the specific duties of the Sanitary Commissioners with the local Governments of India and in what manner certain parts of the proposed scheme might be modified with advantage.

18. Speaking generally, I think the Sanitary Commissioner may reasonably be expected to act up to the instructions conveyed in paragraphs 4, 5, 7, 8, 9 and 10 of the letter from the Secretary to the Government of India, which lay down certain very important and specific duties, in the great utility and actual feasibility of which I entirely acquiesce.

19. Thus, the general consideration of the sanitary condition and requirements of the country will, I conceive, embrace the main object of these new Indian sanitary appointments; in other words each Sanitary Commissioner will have to apply himself to the gradual initiation of a system of sanitation, the broad principles of which shall be suitable for the province to which he is attached.

20. Such a system will, in my opinion, work to the greatest ultimate advantage, if it be carefully instituted within reasonable and strictly practicable limits; if the Sanitary Commissioners are not overburdened, from the first, with an avoidable multiplicity of duties; and if the scheme, as one of general sanitary investigation and administration, be allowed to grow gradually, according to the requirements of time and place, the appreciation on the part of the people of its value, and the readiness on the part of the State to sanction a gradually increased money-outlay in connection with it.

21. With regard to paragraph 11 of the Secretary to Government's letter, bearing on food supplies and harvests:—Although these subjects must at all times deeply interest the Sanitary Commissioner, in their relation to the welfare of the people, I submit that they more immediately fall within the cognizance of District Officers, and of those servants of Government whose duties lead them to be constantly watching the sources of State revenue; and that consequently when reports on such subjects as drought, failure of crops, scarcity, and famine are required by the Government, the Officers of Health should not be held responsible for these.

22. With regard to paragraph 12, it appears to me a matter of great interest and importance that, as far as it can be accomplished, the climatic, sanitary and general medical history, past and present, of every city and station in India, should be written; and that sanitary charts of the country should, in the course of years, be produced, displaying the varied ratios of health, of sickness and of mortality in the different districts. Much professional co-operation, however, extending over prolonged periods, can alone work out an object so desirable and at the same time so difficult as this.

23. In connection with this subject I think it right here to allude to the fact that a Civil Surgeon in medical charge of a large station can seldom leave his post for a single day; and that consequently " a thorough personal examination of the District " by him is simply a matter of impossibility—unless he be specially relieved for this object by Government, or unless he pleases to devote his attention to the subject during periods of privilege leave.

24. I am of opinion that all the duties connected with statistical registration and compilation should be kept entirely apart from those of the Sanitary Commissioner.

They should be entrusted to a separate Government servant, either the Statistical Officer to the Principal Inspector-General, Medical Department, or what would perhaps be still better, to some one with absolutely no other duties to attend to. The work, to be well executed, would be sufficient to engage his undivided time.

The results of such registration ought certainly to be made known systematically, in a synoptical form, to the Health Officers of Provinces and to the Sanitary Commissioner with the Government of India, as affording valuable evidence of the existing state of the people, and as presenting the index of prevailing disease and of ordinary or excessive mortality.

Reports of this nature ought to be communicated periodically, and with as little delay as possible, as it is of the first importance that the Sanitary Commissioner should be aware of the prevailing causes which are producing, disseminating or perpetuating disease and death in large communities, and also to enable him to analyze the Reports and draw from them those deductions upon which judicious sanitary regulations may, from time to time, be safely based.

In my opinion it is far too much reasonably to expect that Sanitary Commissioners can perform the duties of Registrars-General. Such a combination of functions is entirely at variance with rules in force in England and in all European countries; whilst it may be remarked that in the United States of America a special *Bureau of Vital Statistics* has for some years been maintained.

An officer liable to be constantly travelling through Indian districts,—with his mind fully occupied with subjects of great and immediate importance,—engaged in personal sanitary inspections and inquiries, in extensive correspondence and in difficult Report-writing, cannot, I maintain, be reasonably required to collaborate, test and publish the results of registration affecting many millions of people.

It could scarcely be a matter of surprize if the results proved highly unsatisfactory and fruitless.

Were such duties to be imposed on the Sanitary Commissioners they would materially interfere with—if they did not actually preclude the possible performance of more immediately special work.

I believe I am correct in stating that by the Government letter, Military Department, No. 225, dated 15th June 1867, it was contemplated that duties of the nature of those of a Registrar-General should ultimately be performed by the Statistical Officer to the Inspector-General, Lower Provinces.

I know of no man in India more qualified, by nature and training, for such an important duty than Dr. Bryden.

25. Regarding paragraph 14, it is proposed that "Sanitary Commissioners should visit and remark on the sanitary condition of all jails, dispensaries and hospitals, as well as all other public institutions; and that they should similarly remark on the prophylactic results of vaccination in the districts which they visit."

It seems to me extremely important that the Sanitary Commissioners *should be permitted* to visit all public institutions whatever, within the provinces to which they are individually attached, and also that it should be deemed part of their duty to consider in what degree the internal conditions therein observable bear on the sanitary interests of the general community. But I would presume to suggest to the Government that all direct and usual reports on jails, dispensaries and hospitals should still come from those Officers who, in the past, have furnished them, by the orders of Government; indeed that, in this respect, no change or alteration whatever should occur; that heads of distinct departments, such as the Inspector-General of Prisons, the Superintendent General of Vaccination, the Inspector-General of Dispensaries or the Officer acting in this capacity, should, as heretofore, submit—as the natural and most competent authorities to do so—their usual Annual Reports, in which the subject of sanitation is necessarily dwelt on; but that they should, at the same time, be invited by Government heartily to co-operate with and to assist, in every possible manner, the Sanitary Commissioners, with whom they may indirectly be brought in contact, and whose desire it should be also vigorously to co-operate with them for the public good.

It seems to me that Indian jails, dispensaries and hospitals are institutions of far too great importance and value to admit of any part of their actual supervision being made over to a special Officer of Health, who has otherwise more than sufficient work to occupy him; that in such matters divided responsibilities are objectionable; and that not only the entire superintendence and control of such establishments had much better remain as heretofore in the hands of those experienced and qualified men who have, up till now done full justice to their position, but that all reports of their separate establishments, whether directly bearing on sanitation or not, should still come from them.

The Sanitary Commissioner may with advantage be permitted to generalize upon all that he observes throughout the country, and upon all that he finds written by competent authorities on the subjects of Jails, Dispensaries, Hospitals and Vaccination.

26. With regard to "the relative position" which should be held by Sanitary Commissioners, it appears to me that they would act most usefully if they were regarded as Secretaries to the Local Governments in the Sanitary Department, and considered as immediately unconnected with all other servants of Government.

District Civil Officers might be instructed to lend them all possible assistance, and to supply them with information on the extent to which diseases are supposed to be prevailing amongst the people; and Civil Surgeons might similarly be directed carefully to communicate with the Sanitary Commissioners on the specific character and identity of prevailing diseases, and their probable causes.

27. I am very strongly of opinion that "carefully digested *Quarterly* Reports" should not be required of the Sanitary Commissioner.

Do what he may, this officer will, at all times, have an overwhelming amount of correspondence on his hands; and the mere fact of his being obliged to move about a great deal ought to be accepted as his excuse for not submitting *four* carefully digested reports every year.

The ordinary current correspondence of his office; the constant duty of accumulating information; the wearisome task of personal sanitary inspection in an Indian climate, and the time required for thought and study, will leave him without a leisure hour.

I think he should at all times be ready and able to furnish required information to the Government on any sanitary subject; and be held responsible for the submission of an Annual Report, giving an account of his stewardship and affording a careful analysis and exposition of the working of the sanitary system with which he is connected.

28. Having above remarked on the more important parts of the Secretary to Government's letter, I would now indicate what ought, in my opinion to be the scope of the Sanitary Commissioner's duties, and what the nature of the objects which he should always have before him.

29. His first and great duty will clearly be *to inaugurate a systematic and practicable sanitary organization for the province* with which he has to deal—the great object being to lessen mortality generally, and to diminish present average rates of prevailing sickness.

To accomplish such a scheme, on well assured scientific grounds, he must—

(*a.*) Accumulate practical facts and information *by a well-defined system of inquiry.*

(*b.*) He must undertake *personal sanitary inspection* in towns, villages and districts, with the object of investigating the specific endemic diseases of the country, and epidemic influences when and where they are in operation.

The sanitary state of the rural and urban population will thus be always, engaging his attention; and the discovery and removal of insalubrious conditions, by the applications of modern Preventive Medicine, will be his daily occupation.

(*c.*) Having obtained local information from District Officers, civil and medical; having personally gone into the districts and taken counsel with such officers, and with all other members of society capable of furnishing him with trustworthy and useful data; having made a direct study of the local causes of exceptional sickness and mortality, the Sanitary Commissioner—gleaning and arranging his materials—should *carefully record the results;* bringing to the notice of Government all the sources of disease that fairly appear to be of a removeable nature, remarking on all neglect or ignorance on the part of the people of common and necessary hygienic requirements; and representing, with as great accuracy as possible, the specific nature and actual results of pestilences.

(*d.*) Having done this, he should lay before the Government suggestions whereby the science of modern hygiene should assume a direct bearing and exert a practical influence on the sanitary requirements of the country.

Thus, explicit recommendations should be brought forward regarding possible improvements in the conservancy of towns and country; prophylactic measures should be systematically initiated to counteract those abnormal conditions that produce and increase disease; all measures should be submitted which are likely to control or mitigate the desolating influence of cholera, small-pox and the like; and every circumstance should be minutely dwelt on which might, in an important degree, prove conducive to the health interests of those districts in which fevers have (more particularly of late years) produced such disastrous results, and which further furnish us with a sad index of much general suffering and wretchedness.

30. Thus it will be seen that (*a*) systematic inquiry; (*b*) personal inspection; (*c*) careful analysis, arrangement, summarizing and record of results; and (*d*) the furnishing of sanitary advice to Government when required, appear to me broadly to be the proper duties of the Sanitary Commissioners.

31. All valuable scientific truths, whether elicited by direct observation or obtained indirectly, should form the basis of an appropriate and permanent sanitary system for India.

32. The Health Officers in India should have in view the advisability of bringing out, in the course of time, a *Sanitary Code* or *Manual of Hygiene*, specially applicable to this country; in which experiences and rules for preserving civic health in villages, districts, camps, stations and cities should be insisted on,—somewhat after the general plan which, of late years, has so successfully been applied, by the English Government to the sanitary interests of the British soldier—whether he be found in barracks, on the line of march, bivouacking, drilling on parade, doing duty in a guard-room, lying sick in hospital, or confined in a military prison.

33. The Sanitary Commissioner should, with the approval of Government and with the assistance of State authority, collect a useful library of scientific reference on sanitary matters, bringing together valuable reports, journals, books, proceedings and transactions of scientific societies, maps, &c.

He should be regularly supplied, by order, with all valuable sanitary reports from England, France, Germany and America.

34. The Sanitary Commissioner should give much of his time to the study of epidemics, particularly as regards the following points: origin, predisposing and exciting causes, mode of propagation, course, virulence in particular localities or buildings; how influenced by caste, age, sex, habits; symptoms, complications and *sequelæ*; extent of sickness and degree of mortality occasioned; modes of treatment; remedies successfully employed; evidence of diffusion by human intercourse and communication with infected localities; relation to contaminated air, polluted water-supply or other subsidiary causes; precautionary measures for prevention or mitigation of the evil: rules to be observed during an outbreak; the period of its duration; its subsidence, disappearance, &c.

35. The Health Officer should carefully collect all information on the laws governing the operation and spread of epidemics; and he should endeavour after a time, (if possible periodically) to publish a series of *Indian, Epidemiologial Notes* or *Transactions.*

36. The subject of contagious and infectious diseases must continually engage his attention; also the consideration as to the extent to which they can be staved off, arrested or cured by personal inspection, isolation, and other protective arrangements.

37. He must consider and report on subjects bearing on quarantine cordon regulations, and prohibitory legal enactments; and he must judge carefully how far authoritative interference is justifiable or otherwise, under particular circumstances.

The careful regulation or restriction of Medical Police will be one of the most difficult subjects upon which he will be continually liable to be consulted.

He will have to devote much of his time and energy to sanitary topics relating to *mélas*, and other large gatherings of the people; to a study of the danger of disease being so spread, broad-cast, over the country; to questions of interference and of vigilant Sanitary Police that may judiciously be advocated, or, on the other hand, to the possible abuse of subordinate official authority under such cricumstances. He will, in short, have to sift the whole great subject of quarantine in India, to determine how far it is really practicable, and to what degree it can be made to afford protection to those who are liable to be exposed to epidemic influences.

38. Much discrimination and enquiry into local medical requirements, social conditions, and existing public feeling, will be necessary before the Sanitary Commissioner can confidently advise the Government on matters of this nature, which involve not merely questions of public health, but considerations of vast political importance, in connection with which it must be of the greatest moment that the adviser of Government should not only be perfectly conversant with the special character of measures which, in the abstract, may be said to be absolutely appropriate, but with the national modes of thought which are likely to lead men to regard innovations of one sort or another as actual benefits and matters worthy of approval, and not as sources of meaningless personal annoyance and grounds for general discontent and detestation.

39. The Sanitary Commissioner should, from time to time, cause to be published, in the vernacular, for the information of the people, simple rules, directions and recommendations on sanitary subjects.

The object of these little pamphlets being to bring before the lower classes in India the elementary principles of Hygiene; to enunciate as clearly and simply as possible the general causes of disease; to interpret for them those broad laws of Nature upon which public health greatly depends, and which the natives of India do not yet understand; to advise them on all matters detrimental to their physical well-being and destructive of life; to teach them that the existing high rates of mortality in certain parts of India are really not inevitable; that were certain precautions adopted, certain modes of life guarded against, and certain conservancy measures enforced, a diminished ratio of sickness and death must undoubtedly be the result; to insist on the economical loss attending prevailing ill health, and the truth of the maxim that "public health is public wealth;" to counteract, to the utmost, their present ignorance, neglect, inactivity and almost criminal indifference regarding matters bearing on Hygiene; to strive, as far as may be, to convey to their apprehensions the information required in a manner not displeasing to them, and on principles which may meet with partial if not entire approval, and sooner or later call forth gradual efforts at self-help.

40. There are yet many other subjects which must engage the thoughts of the Sanitary Commissioner. A few of these may here be noted.

(*a.*) Increase or decrease of population.

(*b.*) Incidence of population to the square mile.

(*c.*) The area and characters of cultivated and uncultivated tracts.

(*d.*) The incidence of disease on various classes; and on persons of different age, occupation, caste, &c.

(*e.*) General modes of life and social habits predisposing to disease and death.

(*f.*) Areas of irrigation.

(*g.*) Construction, number and depth of wells.

(*h.*) Relation of embankments, roads and railways to ratios of health and sickness.

(*i.*) Drainage, sewerage, conservancy, malaria.

(*j.*) How the presence of tanks, canals, rivers, swamps and jungle tracts affect the condition of the people.

(*k.*) Diseases of cattle.

(*l.*) Study of the seasons and of general Climatology.

41. I here say nothing of Physiology, Pathology, Chemistry and Meteorology, of which sciences it has been aptly said that Hygiene is but the exponent.

42. If it be conceded that any or all of the subjects above alluded to are liable to demand consideration and to engage the time of the Sanitary Commissioner, I think it is but reasonable to conclude that such special sanitary topics should embrace all the duties to be required of this public

officer and that he should not be required or expected to occupy himself with executive details or to furnish any reports on subjects not immediately comprised in the term " Sanitation."

43. I regret that I have not been able to express my views more briefly ; but, under the circumstances, I have thought it right to dwell at considerable length on the various lights in which this many-sided subject may be regarded.

44. As this letter has reached such unusual length, perhaps it may be well for me to furnish a condensed statement of the views which it is meant to embody.

Recapitulation (1.)—That the duties of the Sanitary Commissioner should broadly consist (*a*) in the constant accumulation of special sanitary information,—chiefly bearing on the ratios of prevailing sickness and the identity of specific diseases ; (*b*) personal sanitary inspections ; (*c*) the record of results ; (*d*) advice to the Government in urgent matters regarding public hygiene.

(2.) That he should have in view gradually to build up a sound, practical and scientific system of hygiene for India.

(3.) That he should collect material for a Sanitary Manual or Code of Hygiene.

(4.) That he should bring together a good special library.

(5.) That he should carefully observe Epidemics, studying the laws which govern them.

(6.) That he should periodically edit Indian Epidemiological Notes or Transactions.

(7.) That he should carefully consider the subject of the prevention and arrest of contagious and infectious diseases.

(8.) That he should make a special study of the prevailing fevers of the country, their causes and the possible modes of mitigating their ravages.

(9.) That in the course of years, he should endeavour to produce Sanitary charts of the Districts, and a medico-topographical history of the province.

(10.) That he should report on *mélas* and other large gatherings of the people ; inaugurating measures of precaution before they occur.

(11.) That he should report on the advantages or disadvantages of quarantine in India.

(12.) That he should judge generally of the drainage of the country ; and report on the conservancy of villages, towns and districts.

(13.) That he should report on the use and value of disinfectants and deodorants.

(14.) That he should publish popular information for the people on sanitary matters.

(15.) That he should produce an Annual Sanitary Report of the province, showing what has been done and what seems urgently called for in the way of sanitary reform.

(16.) That he should not have anything to say to the actual registration of births, deaths and marriages.

(17.) That he should not be held responsible for reports on any part of the internal or general administration of jails, dispensaries and hospitals.

(18.) That he should not have to report on the workings of the Vaccine Department.

(19.) That the submission of reports regarding food-supplies, drought, failure of crops, threatened scarcity, or famine, should not be expected of him.

(20) In a word—that as sanitary engineering should be left to the Engineer; skilled chemical analysis to the Chemist whose specialty it is; irrigation surveys to experts in such matters; meteorological records to the Meteorologist, and geology to its own particular department; so mortuary returns, general registration, record of vaccine operations, the finance of dispensaries, and the condition of hospitals and of prisons should be left entirely to those who are and have been for years immediately concerned in their proper management and control.

(21.) That the Sanitary Commissioner's position should be that of a special adviser to the local Government, and that his appointment should be regarded as a consultative one, and not executive.

45. I cannot ponder on the manifold important duties above enumerated without being impressed with a sense of the almost incalculable difficulties that surround them, and, under the circumstances, with feelings of extreme diffidence as to my own capabilities. At the same time I confess to deriving satisfaction from the thought that, by devoted perseverance, some of those difficulties will be mastered, and results attained, useful to the people of India and worthy of approval by the Government.

46. I beg the favor of your being good enough to lay this letter before His Honor the Lieutenant-Governor.

APPENDIX B.

On the Duties of Sanitary Commissioners.

I have the honor to acknowledge receipt of your letter No. 5217 of the 31st October 1868, regarding the Resolution of the Government of India on the subject of the duties of the Sanitary Commissioners with the local Governments.

2. In reply to the *2nd paragraph* of your letter, I have the honor to state, for the information of His Honor the Lieutenant-Governor, that, on the whole, it appears to me advisable that the Sanitary Commissioner for Bengal should, *ex-officio,* be a member of all Municipal Committees in the Lower Provinces.

3. Such a measure would afford him certain facilities for acquiring a direct knowledge of the working of Indian Municipalities in sanitary matters.

4. It would also perhaps assist him in suggesting to the Government wherein the laws regulating public health in India might with advantage be modified.

5. It should, however, be clearly understood that the Sanitary Commissioner in becoming an *ex-officio* member of Municipal Committees is not to be expected, on all occasions, to attend the meetings of such Committees, but that he should have it in his power to do so whenever he pleases.

6. He should watch the proceedings of the Municipalities in order that he may advise the Government in all matters wherein it appears that points of great sanitary importance are involved. By becoming an *ex-officio* member of a Municipal Committee, it should not be understood that he is directly a Health Officer of that Committee or necessarily responsible, to any degree, for the action taken by the said Committee in subjects relating to public health.

7. Every existing Municipal Committee has already its Health Officer. The Sanitary Commissioner should enjoy the privilege of directly watching the proceedings of Municipalities, so that he may thoroughly understand all subjects connected with sanitation, in relation to which references may at any time be made to the Government by such Municipal Corporations.

8. The object of his being an *ex-officio* member of Municipalities is therefore, to render him a more valuable adviser to the Government, and not to appoint him as a second Executive Health Officer to the Municipality.

9. This distinction should, it appears to me, be carefully defined.

10. With regard to *paragraph* 3 of your letter, bearing on the orders conveyed in *paragraphs* 19 and 20 of the Resolution of the Government of India, I beg to offer the following remarks :

I shall endeavour to make the sum of Rupees 240 meet the necessary outlay for my Office Establishment, although, by the disallowing of the appointment of a Sub-Assistant Surgeon, as my personal Assistant, the sum is considerably below that which I originally applied for.

11. I await the Lieutenant-Governor's orders regarding office accommodation. Heretofore I have drawn Rupees 100 a month as an allowance for office-rent, because the necessary accommodation for such an office was not available in Government buildings. If such be still the case, I beg to have authority to continue to draw Rupees 100 per mensem as heretofore.

12. I beg to apply to Government for an allowance of Rupees 100 a month for house rent.

Such an allowance is granted to all military staff officers in Calcutta in consideration of the expensive rates of living at the Presidency Towns. (*Vide* Government Order, Military Department, No 156 A., dated Simla, 13th October 1863.)

The Deputy Inspector-General of Hospitals at the Presidency is granted such special allowance (Rupees 125 per mensem) which is not drawn by officers of his own rank and position stationed in other parts of India.

The Statistical Officer to the Medical Department at the Presidency is also granted such a special allowance for house-rent, (Rupees 75 a month as an Assistant Surgeon.)

The Civil Surgeon of the 24-Pergunnahs is, on the same grounds, allowed Rupees 100 a month.

It appears to me but fair that this sum of Rupees 100 per mensem should be passed in my case, as it is very evident that it clearly falls within the spirit of previous Government Orders on the subject.

The rate of living is greatly higher for a Sanitary Commissioner, (and for any military staff officer, at the Presidency) than in the stations of the North-Western Provinces or the Punjab.

I hope the Government will pass a special order on my case in this respect.

	Rupees.
13. My pay being	1,500 a month.
The allowance now sanctioned for Office Establishment	240
Office rent allowance	100
Allowance passed for contingencies	50
This gives a total, *per mensem*, of	1,890

Allowing Rupees 100 a month for house-rent, would bring the sum to Rupees 1,990, Rupees 10 more might be sanctioned for contingencies, *i. e.*, Rupees 60 instead of Rupees 50, and thus the entire monthly cost of the Sanitary Commissioner's appointment and establishment would be exactly Rupees 2,000 a month.

I trust Government will pass sanction for this amount.

14. The only charge exclusive of the above would be for travelling allowance.

With reference to paragraph 21 of the Government Resolution, I am of opinion that 12 annas instead of 8 annas a mile by road, and Rupees 5 instead of Rupees 4 *per diem* during halts, should be passed in the case of my appointment, travelling being confessedly more difficult and more expensive in the Districts of Lower Bengal than in those of the North-West or Punjab.

15. I also beg to apply for a travelling allowance for one clerk at the rate of 4 annas a mile, marching; three-tenths of pay, halting; and three annas a mile by Railway or Steamer.

16. Thus Rupees 2,000 a month, and the above rates of travelling allowance, would include all the expenses of the appointment as now applied for. They appear to me not only reasonable, but absolutely necessary.

I therefore trust that they will be passed by the direct orders of Government, without any reduction.

17. It appears to me of considerable importance that the office of the Sanitary Commissioner for Bengal should be " a privileged one" in regard to Postal arrangements.

This point has not been touched on in the Government Resolution.

On it, in my opinion, greatly depends the proper carrying out of my duties.

When I am moving about on tour, the present system of using service stamps, and recovering the cost of these by contingent bills, is extremely inconvenient.

I beg that this point may be conceded, and that orders may soon be passed on the subject. It is not one of secondary importance.

18. In paragraph 4 of your letter under reply, it is noted that the Lieutenant-Governor will be glad to receive any observations which I may have to offer on any of the matters treated of in the Resolution.

I accordingly presume to submit a few remarks on certain portions of the said Resolution.

19. I am glad to observe that, on re-consideration of the subject, His Excellency the Governor General in Council has been pleased to rule that Sanitary Commissioners with local Governments and Administrations shall "not be called on to undertake any work which is not intimately associated with the special objects for which they were appointed; that they shall not have transferred to them any duty now performed by others, unless that duty is unmistakably one which more properly belongs to them.

"That they shall be held to have no duties connected with the management of jails, the dispensaries, or with the operations of the vaccine department, or any institution under the control of the heads of other departments."

That they shall not be required to prepare a carefully-digested report of their proceedings quarterly for submission to the local Governments but that "an Annual Report, as concise and short as possible, will be sufficient."

That the duty of keeping a watch over the food-supplies within their jurisdiction "shall not be imposed on the Sanitary Commissioners."

That they "will have nothing to do with Military Cantonments."

That "they will be entirely subordinate to the local Governments and Administrations, and to no other authority."

It appears to me that all these orders tend to put the Sanitary Commissioners on exactly their proper footing.

It shall be my desire and object to co-operate with the heads of other departments and with all Civil Surgeons, to the utmost of my power, for the sanitary welfare of the general community, without in any way interfering with their proper duties.

20. There yet remain certain parts of the Resolution of the Government of India which, in my opinion, call for further careful consideration.

I take the liberty of offering a few remarks under the seven following, heads:—

1. Registration of Births and Deaths.
2. Lock Hospitals.
3. The connection of the Sanitary Commissioners with Civil Surgeons.
4. The issue of Orders or Circulars.
5. The relation between the highest Sanitary Authority and the Commissioners with the local Governments.
6. The publication of Sanitary reports or proceedings by the local Governments.
7. The official position of the Statistical Officer.

(1.)—*Registration of Births and Deaths.*

21. In paragraph 7 of the Resolution, it is laid down that something should at once be done towards carrying out a system of registration of births and deaths.

Having of late given attention to this subject, I am prepared to submit some proposals regarding it to the Government. But before doing so, am desirous of obtaining all available information, from the Bengal Secretariat, as to the extent to which registration has in the past been attempted in any parts of Bengal.

In Calcutta, for instance, at the present time, if I mistake not, registration is entirely accomplished through police agency. But formerly there were paid Registrars, which appointments, it is believed, no longer exist.

I should be glad to have any and all available information on the success or want of success of the present and past systems. Again, within the last few months, some new orders were issued on this subject to District Officers throughout the Lower Provinces.

I should be glad to be favoured with a copy of such orders and all papers connected with them.

It is without doubt a matter of great importance that vital statistics should be systematically collected in Bengal, and it is to be hoped that something useful may ere long be accomplished in this direction.

The opinions of Commissioners of Divisions have, it is believed, been received by the Government on this subject.

I should be glad to have access to all such information directly or indirectly bearing on the subject of Registration of Births and Deaths.

This is partly comprised in the Government Resolution, on the subject of Statistics, dated Fort William, the 14th May 1868 with reports in reply by Commissioners of Divisions, "as to the best means of collecting information for the compilation of approximately accurate Mortuary Returns, as required by the Government of India." Copies of these are not in my possession. I should be glad to have them with any others relating to the history of the same subject during past years.

(2.)—*Lock Hospitals.*

With regard to paragraph 9 of the Resolution of the Government of India, I should wish to have all available information regarding Lock Hospitals now in operation in the Lower Provinces. I do not quite know where to obtain such information; and perhaps it is not the wish of the Government that I should myself call for it.

If this be the case, I hope the Lieutenant-Governor may see fit to issue such orders as may be necessary under the circumstances.

Again, a large Lock Hospital Establishment has lately been proposed and budgeted for the town of Calcutta.

I should be glad to know if the Lieutenant-Governor desires that I should in any way be associated with the organization of such an Establishment. It appears to me that there should be a certain number of visitors appointed for the careful regulation of the Calcutta Lock Hospital system; and that, with the approval of the Municipality, I should, *ex-officio* be one of the said visitors.

In paragraph 9 of the Resolution, it is laid down that the Governor-General in Council thinks "there will be no better practical test of the efficiency of a Sanitary Commissioner than the success or failure of the measures which are taken for the prevention of venereal diseases."

It should here be observed that Indian Lock Hospitals are, as a rule, within the limits of Military Cantonments, regulated by a Cantonment Board of Health, and supported from Cantonment Funds.

But in paragraph 11 of the Resolution, it is noted that "the new Sanitary Officers will have nothing to do with Military Cantonments."

It is possible that a little difficulty might arise on this point. The success or failure of anti-contagious measures is now almost entirely in the hands of Military Authorities, who pay for such measures according to the amount of Cantonment funds at their disposal. It might therefore, be well if all local Military Authorities were addressed by the Supreme Government on this subject, in order that it may be understood that in co-operation with Civil or Military Surgeons, the direction of prophylactic measures, of the description now alluded to, will distinctly be regarded by the Government as part of the Sanitary Commissioner's duty, the carrying out of all executive detail being left entirely to the Civil or Military Surgeons in charge of Lock Hospitals.

If, on the other hand, it be desired by the Government, that the Lock Hospital system should be extended generally beyond the limits of Military Cantonments, the greatest difficulty in the way of success will be the question of available public funds. The expense of effective establishments, organized for the protection of the general community, must be considerable.

In Russia, for instance, such a system was brought into operation on an extended scale. But it was afterwards found necessary, in a great degree, to abandon the scheme, on account of its great cost.

I hope it will be understood that I, by no means, desire to depreciate the importance of paragraph 9 of the Resolution.

It seems, nevertheless, necessary to point to the fact that an absolute want of local funds may, in many cases, explain, why prophylactic measures, against contagious disease, are not effectually organized and carried through.

This one difficulty of " want of local funds " is for ever in the way of the Indian Sanitarian, and it is but right that the fact should be fairly acknowledged. The success and the usefulness of the hygienist are, in this manner, continually being curtailed, and I respectfully submit that a judgment formed of the practical test of his efficiency should, to a great degree, be based upon this essential consideration. It is important to note that the funds at present allotted in India for the general protection of public health are altogether insufficient for the great object in view. Indeed it is this that more hinders the efficiency of Sanitarians than anything else, and I presume to express the opinion that the real secret of success or failure in the carrying out of great sanitary measures, such as that now under consideration, is the amount of public money available for such purposes.

Perhaps His Honor the Lieutenant-Governor may be pleased to call for information as to the amount of available funds in the different districts of the Lower Provinces for such a purpose as the prevention of venereal disease amongst the masses.

I am afraid that but few of the replies could be considered very satisfactory and yet, without considerable expenditure, the most eager and sagacious Sanitarian must be baffled in his wishes and efforts. Unfortunately, his efficiency depends, in many instances, as much upon varying circumstances, such as the existence or absence of available public money, as upon his own personal efforts and ambition.

It is to be hoped that, ere very long, the Government of India seriously looking this great difficulty in the face, may, in consideration of its vast importance, be prepared, on a broad basis, to bring about enactments and especially to allot such imperial resources as to render it practicable for public hygiene to be worked in a manner which, under existing circumstances is quite beyond the scope of possible fulfilment.

(3.)—*The Connection of the Sanitary Commissioner with Civil Surgeons.*

This is alluded to in paragraph 10 of the Resolution.

It appears to be inexpedient that Civil Surgeons should be under the orders of the Sanitary Commissioners. As a rule, all official communications occurring between these Officers should be carried on through the local Government.

If information or statistics are required by the Sanitary Commissioners, they should be called for by the Government, on the suggestion or application of the Sanitary Commissioner, and similarly, all information and reports on sanitary subjects, coming from Civil Surgeons, should be sent to the Government. This system is in itself absolutely simple, and it will do away with any possibility of official misunderstanding occurring between Civil Surgeons and the Special Sanitary Adviser of the Government. This being the rule laid down for general guidance, it will yet be possible for the Sanitary Commissioner, in many instances, to obtain, directly in a private or demi-official manner, from Civil Surgeons who are his friends, much of the information he may require. In most cases I feel sure that all possible assistance will be readily and courteously afforded him by Civil Medical Officers. In any special case the official rule above laid down should be strictly adhered to, whereby any possible difficulty will at once be removed.

(4.)—*The issue of orders or Circulars.*

This point is dwelt on in paragraphs 11 and 12 of the Resolution.

I am quite of opinion that "no Circulars or Orders should ever be issued by the local Sanitary Commissioner, except under express authority given in each separate case by the local Governments and Administrations."

I further fully appreciate the benefit likely to accrue from the local Government being possessed of the opinions of the Imperial Sanitary Officer, in addition to those of the local Sanitary Commissioner.

I also entirely concur in the opinion that the Sanitary Commissioner with the Government of India should obtain the fullest information regarding the public health of each province. Yet, bearing these two most important points clearly in view, I presume to think that "whenever a Sanitary Commissioner thinks it necessary that any general instructions or circulars referring to matters of considerable sanitary importance should be issued," that he should be directed, as a rule, to submit his draft of such instructions or circulars to the *local Government direct,* and not, *in the first instance,* to the Sanitary Commissioner with the Government of India.

The Lieutenant-Governor, having considered such Circulars or instructions for himself, could, in matters of importance, address the Government of India on the subject, and thus obtain the opinion of the highest Sanitary Authority. This mode of procedure might, for many reasons, be found to be preferable to that indicated at the beginning of paragraph 12 of the Resolution.

As the special and direct adviser to the local Government, the Sanitary Commissioner should communicate, particularly on all matters of importance, directly with that Government and not through any official medium. The benefit of having the Imperial Sanitary Commissioner's opinion on all subjects of importance will be very great, and I should myself always attach great weight to such opinions. Yet it would appear to be reasonable that all questions of official interest, engaging the attention of the local Sanitary Commissioner, should by him be submitted immediately to His Honor the Lieutenant-Governor.

On all matters of general enquiry, a demi-official correspondence might be kept up between the Imperial and the local Sanitary Authority.

(5.)—*The relation between the highest Sanitary Authority and the Commissioners of Health with the local Governments.*

This point is dwelt on in paragraph 13 of the Resolution.

There can be no doubt that the Imperial Sanitary Commissioner ought to be carefully supplied with information from all parts of India, and that he should be privileged to apply for the same whenever he requires it. But, for many reasons, which it is scarcely necessary here to particularize, it would appear to be highly desirable that all applications made by the Sanitary Commissioner with the Government of India, for information from the different Provinces, should be addressed to the local Government direct, and not to the local Sanitary Officers.

The various Commissioners being solely the advisers and counsellors of the different Governments, under whose orders they serve, it would be much more in form if all communications reaching them, from the Central Sanitary Authority, should come direct from the local Governments. Opportunities would thus, in all cases, be afforded to the Government of regulating the action of the special Sanitary Officers, by the issue of necessary orders.

Without such a system, they would, in point of fact, be able to forward information, and otherwise to act independently of any instructions from their immediate superiors.

Whilst, on the other hand, *with* such a system, public business would be transacted in the usual formal manner, and every possible source of unsatisfactory combination would at once and entirely be removed.

(6)—*The publication of Sanitary Reports or Proceedings by the local Governments.* Paragraph 14 of the Resolution runs thus :—

" Each Sanitary Commissioner should furnish annually to the local Government or Administration to which he is subordinate, a report containing information of all matters of importance affecting the public health of the province which have come to his notice during the past year, with this exception, no reports or proceedings of the Sanitary Commissioners should ordinarily be published by the local Governments. Any special reports regarding the outbreak of epidemic disease, or other matters of importance, should be immediately sent by the local Sanitary Commissioner to the Sanitary Commissioner, with the Government of India. When orders have been passed upon them by the local Government, copies of these should be forwarded for the information of the Sanitary Commissioner with the Government of India, either by the local Government or by the local Sanitary Commissioner, as may be most convenient. Everything of general interest will appear in the proceedings of the Sanitary Commissioner with the Government of India, and these will be published and circulated."

I presume to think that this Resolution might, with great advantage, be re-considered by His Excellency the Governor General.

I believe it to be a matter of primary importance that local Governments should have it in their power to publish, immediately, any reports which they may receive, even before such reports have been seen by the Sanitary Commissioner with the Government of India.

I beg to point to the fact that any report whatever, coming from a Civil Surgeon, is at present, if it be considered advisable, at once published in the *Gazette*, or otherwise, by the local Government. I think the same rule might be allowed to hold good in the case of any reports submitted by the local Sanitary Commissioners.

There does not appear to be any necessity for the publication of regular monthly or other periodical *proceedings* of the local Sanitary Commissioners.

But my judgment tells me that it is very desirable indeed that any special reports should, if it be deemed advisable by His Honor the Lieutenant-Governor be at once published by his order. Copies of all such reports should, on publication, be forwarded without delay to the Sanitary Commissioner with the Government of India, in order that they might, if he considered it necessary, be reproduced or reviewed in his published monthly proceedings or in his Annual Report.

I trust that this point may be considered worthy of re-consideration by His Excellency the Governor General, as, in my opinion, it is one of the most important questions involved in the Resolution.

I feel convinced that the plan here proposed would more perfectly meet the present requirements of the local Sanitary Departments in India than the rule laid down in the present Government Resolution.

In point of fact, as I have already observed, it is only asking, for local Sanitary Commissioners, what already holds good in the case of all Civil Surgeons, and I think I might even say all other officers under the orders of the local Governments.

(7.)—*The Official position of the Statistical Officer.*

This subject has been disposed of in paragraphs 23 and 24 of the *Resolution.* I beg to be allowed to submit a few remarks regarding it.

His Excellency the Governor General in Council has been pleased to direct the transfer of Dr. Bryden, from his former position, as Statistical Officer, Indian Medical Department, to the Office of the Sanitary Commissioner with the Government of India; this partly on account of the anomalous position which Dr. Bryden formerly held, and also because his attention ought now to be devoted to the preparation of important vital statistics connected with the civil community in addition to those of the native Indian Army. In the Resolution it is stated with much truth :—" Dr. Bryden's work is of great and imperial consequence." It is indeed of such paramount importance that I cannot but regret that he should be *attached* to any office whatever.

In my humble opinion, he should be Registrar-General of India; and as such his office and position should be entirely distinct from all others. He should be in an official position, exactly similar to that of the Registrar-General of England, continually supplying information to many different Departments, but *attached* to none of them. The Statistical Department of India should be entirely independent of all others, and the head of it should not appear as a mere arithmetical clerk.

I state this opinion with all due deference to those of other officers; at the same time it does seem to me to be of such infinite moment that I would fain urge the importance of taking advantage of the present good opportunity for establishing a regular Registration Department in India. Each province should have its Registrar of vital statistics, and a Registrar-General should be at the head of all.

Thus information of the very deepest importance would be systematically collected in all parts of India, and we should in time have some approximation to the English system of vital statistics.

I beg very respectfully to urge this question on the attention of the Government.

APPENDIX. C.

ON THE NECESSITY OF SANITARY CO-OPERATION ON THE PART OF CIVIL SURGEONS.

From S. C. BAYLEY, ESQ., Officiating Additional Secretary to the Government of Bengal, to the Inspector-General of Hospitals, L. P., No. 2581, Fort William, the 26th May 1868.

Sanitation

SIR,

THE appointment of a Sanitary Commissioner for the Lower Provinces of Bengal renders it desirable that that officer should be constantly and continuously kept acquainted with the sanitary condition of the country, and that all important information bearing on the health of the people should be systematically furnished to him.

2. I am therefore desired to request that you will be so good as to instruct all Civil Surgeons cordially to assist the Sanitary Commissioner by furnishing him with replies, to the best of their ability, to any question concerning the health of the districts under their jurisdiction which he may address to them.

3. In the event of any unusual visitation of sickness or of any excessive mortality in a district, the fact should be communicated to Government, and a copy sent to the Sanitary Commissioner, and any opinions and suggestions that may be useful, submitted at the same time. This should more especially be attended to during periods of epidemic visitations of cholera, small-pox, &c., and, if necessary, frequent reports on the subject should be sent.

4. Without a system of careful synchronous record, no sanitary scheme can be usefully carried out, nor can the object be well accomplished, unless the officers of Government lend their assistance with willingness and judgment, and take a real interest in the matter; and His Honor trusts that the sympathies and co-operation of all Government servants will to the utmost be enlisted in the cause of systematic sanitary observation and notation as far as their regular duties permit.

5 A similar letter has been addressed to all Commissioners for communication to all District Officers in the Lower Provinces.

From H. L. HARRISON, ESQ., Junior Secretary to the Government of Bengal, to all District Medical Officers in the Lower Provinces, No. 3046, Fort William, the 20th June 1868.

I AM directed to forward herewith an extract from a letter from the Sanitary Commissioner for Bengal, No. 17, dated the 19th ultimo, together with a set of questions on sanitation prepared by that officer for circulation among all District Medical Officers in the Lower Provinces.

2. In Dr. Smith's absence from the Presidency on duty, the Lieutenant-Governor thinks it desirable not to delay the issue of these questions. He therefore directs their transmission to all District Medical Officers, with a request that the answers to them may be sent direct to Dr. Smith, and with the expression of his earnest hope that the Medical Officers under this Government will not lose this opportunity of contributing all the information they possess or can obtain in furtherance of the important objects in view.

From S. C. BAYLEY, ESQ., Officiating Additional Secretary to the Government of Bengal, to the Inspector General of Hospitals, L. P., No. 5316, Fort William, the 6th November 1868.

SIR,

I AM directed by the Lieutenant-Governor to forward herewith a copy of the correspondence noted on the margin relative to the duties of the Sanitary Commissioners to the local Governments and Administrations in India, and their relations to the Sanitary Commissioners with the Government to which they are attached.

From Secretary, Government of India, Home Department, No. [illegible], dated 12th February 1868.

From Sanitary Commissioner, Bengal, No. dated 20th April 1868.

To Home Department, No. 2578, dated 26th May 1868.

From Home Department, No. 128, dated 10th September 1868.

2. The Lieutenant-Governor desires me to draw your attention to the 10th para. of the Resolution of the Government of India in the Home Department of the 10th September last, and to say that His Honor is sanguine that the Civil Surgeons will co-operate with the local Sanitary Commissioner cordially and zealously and furnish him with all the information in their power, and His Honor confidently anticipates that it will not be necessary for him to interpose the authority of Government to insist on their doing so. In this view the Lieutenant-Governor authorises the Sanitary Commissioner for Bengal to communicate with Civil Surgeons directly and without reference to Government.

APPENDIX D.

SANITARY QUESTIONS.

From D. B. SMITH, ESQ., M. D., Sanitary Commissioner for Bengal, to S. C. BAYLEY, ESQ., Additional Secretary to the Government of Bengal,—(No. 17, dated Barrackpore, the 19th May 1868.)

SIR,

I HAVE the honor herewith to forward a list of questions on sanitary subjects which, with the approval of His Honor the Lieutenant-Governor, I propose forwarding to Civil Surgeons throughout the limits of the Lieutenant-Governorship (Assam not included.)

2. The questions embrace wide fields of inquiry; and should they be replied to with care, a great accumulation of valuable knowledge will be obtained.

3. I should be glad to know whether the Lieutenant-Governor would wish me to send these questions myself, or whether he desires that they should be despatched directly from the Government.

4. If the latter plan be adopted, I hope Civil Medical Officers will be invited to give the questions their very careful attention.

5. It might be noted that replies to the questions may be sent in any time within *the next six months;* but that meanwhile it is desirable that as much information as possible should be collected.

6. The questions are necessarily of a wide and very general character, as they are meant to apply to villages, towns, cities, stations, and districts in all the different parts of the Lower Provinces.

7. It is perhaps too much to expect that every question will be fully replied to by every Civil Surgeon. But if the Officers undertaking the work will apply themselves to it in the best way they can, there can be no doubt that much valuable information will be received.

8. Those subjects should be particularly dwelt on, with which each Medical Officer is more specially conversant.

9. In submitting these questions, I would remark that a somewhat similar form was prepared by the Sanitary Commission for Bengal some time ago; and also that my friend Dr. Cutcliffe, when acting as Sanitary Officer for the Meerut Division last year, submitted to local Officers a series of queries, on the whole much resembling these. I mention the fact as I am anxious it should be known, that I have freely availed myself, as far as it served my object, of the labors of others, from whom I desire to take none of the credit I have, however, very considerably modified the *forms* of questions drawn out by Drs. Cunningham and Cutcliffe, condensing them or adding to them as seemed advisable to meet particular requirements in Bengal Proper.

QUESTIONS ON SANITATION.

N. B.—Please write replies only on one side of each sheet of paper.

GENERAL QUESTIONS.

I.—Name of place? Latitude, Longitude?

II.—In what District, Division, &c.?

III.—Do you consider————healthy or otherwise?

IV.—Please to contrast *generally* (in a sanitary point of view) the present and past condition of————.

V.—Can you furnish, in a synoptical form, any general statistics of sickness and mortality during the present and past years? (at the rate of 1,000 per annum.) The statistics of *last year and of this year* are more particularly wanted.

VI.—On what data are the health and mortuary returns rendered? To what degree do you consider them reliable?

VII.—Indicate, as far as possible, the specific nature and identity of prevailing diseases; and (though it be but approximatively) the death rate from specific causes.

VIII.—Are any diseases peculiar to the locality? Are leprosy or elephantiasis common or rare?

IX.—Can anything be said (with probable approach to accuracy) as to the rates of infantile mortality; more particularly as bearing on *sex?*

X.—Has there been any exceptional sickness during the past year? If so, from what diseases? and to what causes do these appear to be attributable? Give particulars under these heads very carefully.

XI.—If disease is more general at one time of the year than at another, describe the conditions under which such prevalence exists—stating, if possible, to what comparative degree this occurs in different parts of the surrounding districts.

(The comparative health of Jails, Police-Battalions, and the Military and Civil population generally might here be touched on—noting daily average of sickness; ratio (per 1,000) of sick to strength; and of mortality to strength.)

XII.—Are different classes of the people affected differently?

Is there any striking contrast in this respect amongst the different predominant castes?

If so, to what degree, and to what causes does this appear to be fairly attributable?

XIII.—Do the people generally look healthy or otherwise? Are they, as a rule, able-bodied and fit for work or feeble and miserable? Are they poor and indolent or industrious and thrifty?

Do you consider that the place is improving or deteriorating as regards the health of its inhabitants?

XIV.—What is supposed to be the present population of ————..

Men.	Women.	CHILDREN.		TOTAL.
		Male.	Female.	

To what degree are these figures reliable, and on what data are they based?

Is there any regular registration of births and deaths? What is the agency employed for this purpose? To what degree do you consider the results of such registration reliable?

If they are faulty, by what system do you think they could be rendered more exact?

Is the population agricultural or non-agricultural? If the latter, what is the chief occupation of the people? Do you consider it a thriving population?

To what degree is the population subject to fluctuation—due to emigration, immigration, exceptional mortality, &c.?

What is the incidence of population to the square mile?

Topography, &c.

XV.—Describe the physical characters of——; the geology of the superficial and deeper strata; are they retentive of moisture or not?

What is the extent of slope, or "fall," favouring natural drainage, over the face of the surrounding country? On an average, at what depth from the surface is the sub-soil water found?

What rivers or canals are near————? and in what direction? At what distances are they? Describe their course. Are the *banks* of those rivers or canals higher or lower than the level of the surrounding country?

Is———higher or lower than the flood level of the nearest river? Or what is its level relatively to the nearest canal bed? Does much "silting" occur in the nearest river, and is much alteration liable to occur, year by year, in its course? If so, does it seem to be a cause of disease? Give particulars.

How is the natural surface-drainage of the country carried off?

Is the surrounding country ever under water? If so, to what degree and during what months is it most so?

Is the irrigation of the country dependent on rivers or canals?

If so, is the volume of water in these generally sufficient?

If it be otherwise, to what degree and under what circumstances is failure in this respect liable to occur? and with what result to crops, &c.?

Do you consider that the natural drainage of the country is interfered with by any altered condition of canals or river banks; by roads, embankments, railways, or the like? If so, please give full particulars on this subject.

Describe the general topographical features of ———; its position; its relation to and distance from marshes, swamps, low-lying ground, jungle-tracts, rank vegetation, rivers, lakes, valleys, tanks, forests, or the sea.

If there are any shallow streams, stagnant *nullahs,* swamps or the like, in the vicinity, please to describe these carefully; particularly as regards their size, depth, the source of their supply, &c.

Do you consider them to be sources of disease?

If so, can you suggest any plan whereby this could be rectified?

METEOROLOGY, CLIMATE, &C.

Please furnish any available meteorological statistics, for past years, and up to date, under the heads of thermometrical, barometrical, and hygrometrical readings, rain-fall, wet and dry bulb, wind (direction, force), clouds, dew, ozone, &c.

State where the observations were taken and by whom?

Note particularly any peculiarities of the past season.

Describe the climate of———, at different seasons of the year; its peculiarities; its influence on the appearance and disappearance of particular diseases at stated times; and its direct effects on persons of different varieties of constitution?

IRRIGATION, CROPS, WELLS, &C.

What is the proportion of irrigated to un-irrigated, and of cultivated to un-cultivated land in the District of——— ?

By what means is water raised for purposes of irrigation? Are wells used or not?

If they exist, what is the average depth, from the surface, of water in the wells, at different seasons of the year? (Observations should be made at early morning before water has been drawn for the day.)

If wells are used, are they, as regards construction, of permanent character *(pucca)* or temporary *(kutcha)*?

If both occur, in what proportion are they found?

Have any of the wells become dry? If so, since when has this occurred and to what cause is it to be assigned?

If they are not dry, has the level of the water they contain been materially altered? When and why?

Are tanks numerous or otherwise?

Has any land been lately reclaimed at or near ———— ?

Has there lately been any remission of revenue at———? If so when did this occur, to what degree, and for what reason?

Is vegetation around rich and plentiful, or the reverse? What trees are most abundant?

Describe the spring, autumn and winter crops. Are they abundant or scarce?

At what distance are they grown from ———— ?

Are local supplies of grain sufficient for the wants of the people? If not, from what market is grain imported, and to what cause is the failure of crops due?

Is food on the whole cheap or dear?

Is the produce of the past year above or below the average of former years?

If blight of crops is liable to occur, please give any particulars you may deem important under this head.

Has famine or great scarcity occurred at————, any time during the past ten years? If so, please give careful particulars, noting, when and how long such conditions existed.

SANITATION, CONSERVANCY, &C.

XVI.—Please give an idea of the general sanitary condition, and of the existing state of conservancy of————.

Who is responsible for the sanitation and conservancy of the place?

Is any real active interest taken in the subject?

Have any sanitary improvements been lately proposed or effected?

Can you suggest any which are likely to decrease sickness or mortality in your station or district?

If there are any local circumstances especially inimical to health, describe these minutely; and if possible suggest means for their removal. Under this head please refer particularly to the following points:—

(a.)—Local causes of malaria; broken ground, hollows not filled up, stagnant ponds, high grass, bushes, under-wood, trees not thinned, jungles not cleared, imperfect perflation of air.

Do you consider the locality very malarious or not?
Have any forest trees been imprudently cut down?
Has any such proceeding in your opinion affected the salubrity of the place?

(b.)—Supply of water for drinking and culinary purposes.
From what source is drinking water obtained? from rivers, streams, wells or tanks?

Do the people ever drink water taken from marshes, ponds, ditches, or puddles?

What is the character of the drinking water generally?
Do you consider it wholesome? Has it been analyzed?
If so, what was the result? What do the natives themselves think of it?

Is the supply abundant or otherwise?

If the water is drawn from tanks or wells, minutely describe these; particularly as to construction, depth, cleanliness, &c.

Also describe the ground in the immediate vicinity of them. Are they subject to contamination from animal and vegetable impurities?

If so, is such contamination direct or by percolation?

Does any surface-drainage pass into the tanks or wells?

Are they surrounded by any wall or enclosure? Are there any drains around? What is the condition of these drains? Do they serve the purpose for which they were intended?

In the case of wells are they protected by a grating or any other covering?

Is the source of water-supply ever cleaned out systematically?

Are any means adopted for preserving the purity of the water? Are decayed leaves found on its surface; or is there any rotting vegetation at the bottom?

In the case of tanks, are persons allowed to bathe where water is drawn for drinking or cooking purposes?

Is washing of clothes allowed at the same place?

Are cattle allowed to bathe or wallow in the water?

Are pigs allowed to burrow in the mud of the tanks?

Is any steeping of jute, or the like, carried on where people draw water for drinking purposes?

Are the carcases of animals ever thrown into the water?

If, on the whole, you consider the drinking water unclean, please describe the various sources of its pollution.

(*c.*)—*Dwellings, Streets, &c.*

Describe the ordinary dwellings of the people, more particularly of the poorer classes.

Has any judgment been shown in the matter of their site, elevation, structure, &c.?

Of what materials are they built?

Are they raised or not? If so, to what height?

What is the average width of the streets and of the roads around? Are they clean or dirty?

Can you give any idea of the average number of inmates in each dwelling; and of the average superficial and cubic space of air they enjoy? Do you think they are overcrowded or not?

What is the general condition of the houses as to cleanliness, within and without?

Are the dwellings properly ventilated? How are they lighted?

(*d.*)—*Drains, Cess-pits, Latrines, &c.*

What is the plan of drainage of ————————?

How is the drainage water disposed of?

What is the depth of the drains?

Are they kept clean or not?

How often are they cleaned out and repaired?

Are they ever obstructed? Do they ever overflow?

What results follow these conditions?

On the whole, do you consider the place properly drained or not? Wherein lie the defects, and how do you consider they could be rectified?

Are cess-pits, so called "well-privies", or the like, made use of at ? If so, please describe them; mentioning how they are situated; particuarly in relation to habitations and sources of water-supply.

Do public latrines exist? If so, describe them and their situation. How are they managed? Are they kept tolerably clean?

What style of private privy is in general use?

Is the dry-earth system adopted?

Are trenches dug for the reception of ordure, or is excrementitious matter allowed to remain unburied? Are the excreta of sick persons disposed of with any special care?

(*e.*)—*Accumulations of filth, manure, stable-litter and refuse-matter generally.*

Are there many accumulations of this nature?

Are they removed at stated periods; or does neglect occur in this respect?

If such accumulations are removed systematically, how often is this done?

Where is the refuse taken to, and how is it disposed of?

Where is the manure of animals deposited, and what becomes of it?

Is filth utilized in any way? If so, how and with what results? Please to describe minutely the general conservancy system at work?

(*f.*)—*Cremation and interment of the dead.*

In what situation is the burning of bodies effected?

Is it done carefully or otherwise?

At what depths are bodies interred, and at what distance from human habitations?

Are corpses ever thrown into streams or pools near human dwellings?

Please mention any facts you may know bearing on neglect in the cremation or burial of the dead.

(*g.*)—*Slaughter of animals and disposal of their carcases.*

Where are animals killed?

How far are the slaughtering-places from the dwellings of the people?

Where are the carcases removed to?

How is the offal of the slaughter-yard disposed of?

(*h.*)—*Obnoxious trades, nuisances, &c.*

What are the chief nuisances at ———?

Are there any objectionable manufactories?

Is brick-making carried on in the immediate vicinity?

Is jute prepared in the tanks?

Is the preparation of hides a common trade?

Where and how is it conducted?

(*i.*)—*General cleanliness and salubrity, or the reverse.*

Is the general atmosphere tainted or not?

If so, what do you consider the chief sources of such atmospheric impurity?

Are unpleasant odours perceptible in many places?

Are these due to emanations from the soil, or to specific causes of localized uncleanliness, as foul air from drains, sewers, &c.

(*j.*)—*Personal cleanliness, ablutions, &c.*

Are the people, as a rule, cleanly in their habits?

If not, wherein do they chiefly fail in this respect?

Are they in the habit of bathing in unclean tanks or similar places?

(*k.*)—*Diet.*

Describe the ordinary diet of the people; the nature and quality of grains, fruits and vegetables in general use?

Is the usual diet varied or not?

Do you consider it, as a rule, sufficient and wholesome or the reverse?

Is food, as a rule, properly cooked or not.

(*l.*)—*General mode of life.*

Is there any thing in the general social habits, customs and occupations of the people that you regard as predisposing to disease? If so, please describe what you believe to be inimical to health in this respect.

(*m.*)—*Unwholesome liquors.*

Is intemperance common or otherwise?

To what extent is it a cause of disease and death?

Please allude to any liquors, commonly indulged in, which you regard as pernicious.

SPECIFIC DISEASES.

XXII.—Please to enter into the subject of the chief endemics and epidemics of———; particularly as regards the following:—

1. Fevers ... { Intermittent. Remittent. Continued.
2. Cholera.
3. Diarrhœa.
4. Dysentery.
5. Small-pox.
6. Hepatitis.
7. Other diseases.

STATISTICAL RECORDS.

Can you furnish any useful statistical records as regards rates of sickness and of mortality from the above noted causes?

Have you ever seen specific *relapsing fever* at———? If so, please furnish full particulars.

EPIDEMICS.

With regard to the past history of epidemics at———, please furnish all the information in your power; touching more particularly on the following points:—

Origin;
Date of appearance;
Predisposing and exciting causes;
Mode of propagation;
Course (direction of progress);
Virulence in particular localities or buildings;
How influenced by caste, age, sex, habits;
Symptoms;

Complications (as evidenced by affections of the bowels, spleen, liver, kidneys, lungs, heart, nervous system, &c.);

Sequelæ;
Extent of sickness;
Degree of mortality occasioned;
Modes of treatment;
Remedies successfully employed;

Evidence of diffusion by human intercourse, and communication with infected localities;

Relation to contaminated air, polluted water-supply, or other subsidiary causes;

Precautionary measures for prevention or mitigation of the evil;
Rules observed during an outbreak;
Period of duration;
Subsidence;
Disappearance;
Connection with any particular meteorological conditions.

CLINICAL AND PATHOLOGICAL OBSERVATIONS.

Can you furnish any observations on the pulse, temperature and respiration in any common endemic or epidemic diseases; or the results of any microscopic or pathological observation under similar circumstances?

SUGGESTIONS.

Can you suggest any measures which you think might be likely to mitigate the desolating influence and to control the spread of cholera, small-pox and endemic fevers.

FAIRS.

Are any fairs held in the district?
At what dates and at what places?
Can you estimate the average number of persons at these fairs?

Do you consider these fairs are a source of disease?

If so, please give your reasons for so thinking.

VACCINATION—INOCULATION.

By what agency is vaccination carried on throughout your district?

To what extent is it practised? Can you furnish any statistics on the subject?

To what degree have the prejudices of the people been overcome in this respect?

To what degree is inoculation practised, and with what results?

QUARANTINE—SANITARY POLICE.

Are there any particular circumstances under which you are of opinion that quarantine, cordon regulations or other restrictive measures seem to be called for; or, on the other hand, do you consider that such measures are, as a rule, futile and annoying.

NATIVE PRACTITIONERS.

Can you supply any information as to the probable number of *Boids, Kobirajes,* or *Hakeems* in your district? Have you, personally, much knowledge of this class of men? If so, please describe your experiences of them. Do you believe their influence among the people to be increasing or decreasing?

Can you give any information as to their modes of practice, and the remedies they employ?

INDIGENOUS DRUGS.

To what extent are you in the habit of employing indigenous remedies?

Please note any information you may consider valuable on this subject.

EPIZOOTICS.

Is there any information regarding diseases of cattle which you consider it of importance to record?

APPENDIX E.

CONSERVANCY RULES FOR VILLAGES; AND SUGGESTIONS FOR THE PRESERVATION OF HEALTH, IN BENGAL.

THE sanitary condition of the districts of Bengal has long attracted the attention of Government; and there is no doubt that the ravages of most of the prevalent diseases may, by care and cleanliness, be very greatly diminished.

The following rules for the preservation of cleanliness and health in villages are circulated for general information.

The Government earnestly requests all zemindars, talookdars, headmen, ryots, and others to give their serious attention to the subject, and to endeavour to carry out these rules to the best of their ability; and the officers of Government will always be ready to give their aid whenever required in furtherance of the object in view. The Government or its officers can do very little to improve the sanitary condition of the country, unless the people themselves are convinced of the necessity of observing the ordinary rules for the preservation of health.

RULES.

I.

The first requisite for health is pure air, and as overcrowding of houses causes bad air, it is desirable, when possible, to have wide open streets, running from north to south and from east to west, through every village, so as to admit a free current of air from whichever side the wind may be blowing. It will not always be possible to open out these streets at once, but every opportunity should be taken to do so. Existing streets should also be widened and made straight to the four cardinal points, where practicable.

II.

Dirt and filth of every kind is allowed at present to accumulate in the narrow lanes and *gullies,* as well as in the compounds of private houses, and the hot sun causes these to putrefy and decompose. The process of putrefaction is most rapid under the combined action of heat and damp, and hence the amount of sickness is greatest just after the rains. Dung and vegetable refuse for manure should therefore never be allowed to accumulate within or on the confines of the village. The cultivating ryot should collect them on the boundary of one of his fields and carefully cover them with dry earth. He should likewise allow no vegetable refuse or sweepings to remain in his cattle-sheds, which should be kept as dry as possible,—all such refuse being carried out daily to the manure-heap on his fields.

III.

In like manner the other inhabitants of the village should daily remove all refuse and manure, from their own homesteads, beyond the confines of the village, storing it in a place to be specially marked out for the purpose by the zemindar or his agent. This place must be at least 100 yards distant from the village. The deposit of all refuse should, as regards the prevailing winds, be to *leeward* of the village, and as far removed as possible from the source of water for drinking or culinary purposes.

IV.

The carcases of dead cattle should not be allowed to remain in or near the village. They must be removed either by the owner or by the village *Moorda-ferash* or *Chumar,* to a selected spot, not less than 500 yards from the confines of the village, and should be there carefully buried. Extreme care should be taken that this spot is not on the side of the village from which the prevailing wind comes, nor at all near the source whence the water supply is derived.

All hides should be given to the *Chumar.*

V.

No *Chumar* should be allowed to prepare hides in the village. A special enclosure should be assigned for the purpose, and it should be as carefully placed, at a distance from the village, as the spot selected for burying carcases.

VI.

No butcher should be allowed to kill cattle or goats anywhere within the village ; a proper place for slaughtering should be assigned near the manure-heap. All the blood and offal of the slaughtering-place should be removed and buried in a trench dug for the purpose.

VII.

The zemindar should assign, to each sex, a locality, distant at least 500 yards from the village, for answering the calls of nature, and all such localities should be at a distance from all public roads and pathways. Those ryots who have no latrines in their own houses should have recourse to these sites. Those who have latrines in their houses will use them, but the ordure must be removed daily, and after being deposited in the common receptacle for filth, be covered with dry earth. These places should be carefully selected, well away from the source of water used for drinking or culinary purposes.

The receptacles for filth should be regular trenches dug in the ground to a depth of not less than three feet from the surface. There should at all times be a layer of earth covering every fresh deposit of filth.

VIII.

Every ryot should plaster the inside and outside walls of his hut with fresh mud once every year, as is already done by many persons in the country. The walls will thus be kept in repair, and the premises clean. Brick-built houses should be white-washed or plastered at least once in four years.

IX.

All the miscellaneous pits and small stagnant ponds within the village, or in its immediate vicinity, should be gradually filled up, with clean earth, and *not with refuse*, and no such pits or holes should be allowed to be excavated in future on any pretext whatever, for the water accumulates in them during the rains, and by its stagnation, generates disease. These pits are generally dug for the purpose of getting clay for making bricks. A rule should therefore be enforced, prohibiting the making or burning of bricks within the confines of the village.

Any existing excavations either in or near a village must on no account be resorted to for the calls of nature.

X.

All accumulations of dirt, garbage, or ordure close to or within a village are dangerous to health. They should on no account be allowed to exist.

XI.

The water of tanks in and near villages is constantly polluted from the following causes :—

(1.) The rotting of the different species of water-plants which grow at the bottom.

(2.) Decomposing leaves fallen on the surface.

(3.) Washing of clothes.

(4.) Bathing.

(5.) The making use of the tanks to steep hemp in,—the very object of such steeping being the decomposition of the external fibre.

(6.) Their being used as places of resort for performing natural offices.

(7.) The throwing into them of the carcases of dead animals.

(8.) The rooting up of mud by pigs, which kills the water-plants, and by their decompositon, taints the water.

(9.) The bathing and wallowing of cattle.

All these practices should be forbidden in the tanks near the villages; especially in those from which drinking water is drawn. For bathing, &c., special tanks should be told off, and all tanks within the confines of the village should be kept carefully clean and pure.

XII.

Cattle should be watered at tanks at a distance from the village.

XIII.

In most parts of Bengal the water used for drinking and culinary purposes is taken from tanks, and as the use of pure water for these purposes is essential to health, *at least one good tank* in every village should be specially reserved with this object. This rule is perhaps the most important of all. The water from dirty and stagnant pools or *nullahs* should not be used for drinking purposes. It causes fevers and other common diseases.

XIV.

No washing of clothes, or bathing, or watering of cattle, should be allowed in tanks set apart for drinking water only. These should be occasionally cleaned out, and the mud and other deposits at the bottom carefully removed; the best time for doing this is in March or April. They should also be surrounded by some enclosure, within which no nuisance of any kind should be permitted.

XV.

That the surface impurities may not be washed into these tanks during heavy rain, every such tank should be surrounded by a *pucca* drain, to carry off the washings of the surrounding land; and no trees should be allowed to stand in such proximity to it as to taint the water by the fall of leaves.

XVI.

In those parts of the country where the water used for drinking purposes is taken from wells, a sufficient number of these must be set apart for the purpose, and secured from contamination in the same way as the tanks referred to in the preceding rules; a wooden grating should be placed over each, to prevent leaves and dirt from getting in. These wells should further be cleaned out annually, and the mud accumulated at the bottom removed. This should be done before the periodical rains set in.

It has been recommended by some,—after a well has been cleaned out,—to place at least two feet of animal charcoal and dry river sand at the bottom.

This has the effect of purifying the water.

XVII.

Where the inhabitants of a village drink water from a river or stream, the whole village-washing must be done *below* the village; and water for drinking and culinary purposes must be brought *from above* the village.

XVIII.

There can be no doubt that if the people of Bengal would take the trouble to boil, and to filter through charcoal and sand, all the water they drink, they would enjoy much better health. This has the effect of, to a great degree, destroying what is unwholesome in the water. At present, as regards Bengalees, the seeds of disease enter their bodies in impure water, and this is probably the most common of all the causes of prevailing sickness amongst them. Perhaps they do not know that the decay of important animal and vegetable impurities goes on in water, in a manner not visible to the naked eye.

It is sometimes stated that it is against the rules of caste for a Hindoo, to drink water which has been boiled. This assertion is clearly unfounded as it is inconsistent with the fact that everything that is boiled in water, such as rice (which is daily eaten by all Hindus) must retain a good deal of that water saturated in it; and so with other articles of diet.

XIX.

Every village should be well drained, and the drains put in order twice a year; and care should be taken not to allow any of the existing *khâls* or water-courses to be obstructed. This is a matter of extreme importance.

XX.

If there are any trees in the village, or within 100 yards around it, the branches should be lopped off every year within twenty feet of the ground. But if there is a belt of trees between a village and a swamp or other unhealthy locality, it should be preserved as a barrier between the village and the source of unhealthiness.

If there be any marsh or low uncultivated land in the vicinity of any village, endeavour should be made to plant it with such trees as will grow on it. Such a precaution acts as a powerful agent against the poisons exhaled from unhealthy soil.

XXI.

No bushes, rank grass, weeds, or under-wood should be allowed to grow in the village or within 100 yards of it. Should there be any hedges in the village or within 100 yards of it, these should be trimmed and cut down twice a year to a height of not more than three feet.

XXII.

Fevers are very liable to result from the presence of rank decaying vegetation and neglected drainage. Indeed, drinking bad water, breathing impure air and inhabiting houses on low bad sites, may be said to be the chief causes of fever in India.

(Drinking polluted water is also a frequent cause of dysentery.)

When a *jheel,* in drying up, gives off malaria and so causes fever, it should, as far as possible, be drained. This, however, if it is done at all, should be done effectually, as incomplete drainage of swamps is often very dangerous.

It should be remembered that ravines are often very unhealthy, in consequence of air and miasm, (*i. e.,* fever-poison) remaining stagnant in them.

No one (particularly persons liable to fevers) should, if it can be avoided, sleep at night under trees. The tamarind and the *neem* tree are particularly to be avoided in this respect.

Burning of fires, day and night at unhealthy seasons, purifies the air, and so affords protection from malaria.

Having wood charcoal in a room also purifies the air. It can easily be kept in open wicker baskets suspended from the ceiling. After it has been so kept for some time, it should be replenished; or, if it is simply heated again in a furnace, it is as good as at first.

XXIII.

The zemindar should assign a special place, at a distance from the village of not less than 300 yards, and also at a distance from public roads, tanks, and wells, for the cremation of the dead. This should be to *leeward* of the village as regards prevailing winds, and in the opposite direction from tanks or wells whence water is drawn for drinking or culinary purposes.

XXIV.

Where there are Mussulmans in the village, a burial ground must also be assigned,—chosen under similar conditions. This should be *at least a mile* from the village and to *leeward* of it, and well away from all sources of water-supply. The dead should be buried at least four feet under ground.

No dead body should be set adrift on a river without proper precaution for sinking it, and no body should be thrown into a canal or small stream or standing pool of water.

XXV.

When any unusual amount of sickness is observed in any village, the Zemindar or his agent should send information of it to the nearest police station, for the information of the District Authorities.

XXVI.

The following rules are worthy of attention on occasions of outbreaks of epidemic disease:—

On the outbreak of epidemics, or of infectious diseases generally, all the villagers should thoroughly cleanse their houses and enclosures, within and without, at least twice a week. If the walls of any of the houses are built of bamboos or stakes, such walls must be plastered once a week or oftener with fresh mud.

XXVII.

The sick should, as far as possible, be separated from the healthy.

XXVIII.

The excretions of diseased persons should always be buried under dry earth *as soon after they are passed as possible*, and at a distance from the village if practicable. This is of much importance.

XXIX.

Bodies of persons dying from epidemic disease should be burnt or buried *without delay*.

XXX.

At times when epidemic disease (such as cholera) is prevailing, it is of especial importance to drink pure water. At such times one should avoid eating unripe fruit or any badly cooked vegetable food.

XXXI.

What is vomited or passed from the bowels by a *cholera* patient must be MOST carefully disposed of AT ONCE; and not allowed to remain or accumulate on the surface of the ground.

A trench should be dug in dry soil, well away from all tanks and wells. Into this trench all cholera discharges should be deposited *without any delay*, and very carefully covered over with earth. Placing some charcoal or lime, at the same time with the earth, also helps to destroy the poisonous properties of such discharges.

The soiled clothes or bedding of a person who has died of cholera should be carefully burnt with the body. Such clothes must *on no account* be washed in tanks or other sources of DRINKING water.

Cholera evacuations, although they are comparatively harmless at first, after a time undergo decomposition and become a source of VERY GREAT DANGER INDEED. *This should always be remembered*; and every possible precaution should be taken, more particularly to prevent drinking water being contaminated, to the very slightest degree, by such poisons.

Many European Doctors believe that the actual cause of cholera lies in the use of tainted drinking-water; that is to say, water into which the evacuations of persons affected with cholera have found their way; either directly from drains, privies or the like; or from neglected surface drainage; or by percolation through a porous sub-soil.

Any person affected with cholera or with choleraic diarrhœa must not be allowed to go to the same privy with those who are well. The danger does not lie in *direct contagion* between individuals, but in the very dangerous properties of cholera discharges once they have begun to undergo putrefactive changes.

XXXII.

Crowding, bad ventilation, neglected drainage, the existence of public nuisances, and carelessness in disposing of excremental matters, which are at all times very obectionable, are doubly so in times of epidemics.

They not only render persons much more liable to be attacked by disease, but they also greatly increase the severity of such attacks.

Fresh air should be allowed to penetrate into the interior of all houses and huts. Neglecting this rule, no body of men can remain healthy.

Care in avoiding all sorts of impurities (whether general or personal) is regarded, in Europe, as of such paramount importance, that it is commonly said in England : " NEXT TO GODLINESS COMES CLEANLINESS. "

Cholera and many of the worst fevers often prevail with intensity, only where everything around is in a filthy state.

Under such conditions the wisest Doctor is liable to fail in curing his patients.

Where all is kept pure—(air, water, houses and streets)—medical treatment and the cure of disease become much more easy and hopeful.

XXXIII.

The spirit of all the above rules should at all times be acted up to.

This is however *more particularly necessary* when men are massed together in large numbers, as when they are making pilgrimages to their favourite shrines.

XXXIV.

Magistrates have been directed to submit annually through Commissioners, the names of those zemindars who distinguish themselves prominently by introducing a system of cleanliness in their villages. All efforts in this respect will receive the marked approbation of the Government.

APPENDIX. F.

ON A UNIFORM SYSTEM OF REGISTRATION.

From DAVID B. SMITH, Esq., M. D., Sanitary Commissioner for Bengal, to J. M. CUNNINGHAM, Esq., M. D., Officiating Sanitary Commissioner with the Government of India,—(No. 95, dated 7th December 1868).

With reference to your letter No. 704, dated Simla, 23rd September 1868, on the subject of a uniform system of registration of deaths suitable for introduction throughout this country, I have now the honor to reply as follows :—

2. The system of registration of births, marriages, and deaths, as it is at present practised in Bengal, I believe to be very worthless indeed.

3. In large towns, it is supposed to be regulated by local municipalities; the police being the immediate agency employed.

4. Judging from what I am conversant with regarding this system, as it has heretofore been carried out in Calcutta, (where one might not unreasonably expect the greatest accuracy to be found in India), I have no hesitation in stating it as my opinion that the results are such as to be unproductive of any precise or valuable information. The mortuary statistics of the Calcutta Municipality are replete with palpable and absurd errors. No valuable or accurate conclusions can be drawn from them.

5. In the districts, the village chowkeedars are supposed to report to the nearest *thannah* all deaths from epidemic disease, or from "unnatural causes," occurring within the field of their observation. This duty can be, and is, I am informed, frequently evaded by the chowkeedar paying a small fee to the nearest Sub-Inspector of Police.

6. On the whole it may fairly be said that the present system of Registration in Bengal is capable of affording little, if any useful evidence on Medical or Sanitary topics.

7. It is clearly a matter of the utmost importance that such a system should be greatly improved, or entirely substituted by another of more practical value.

8. To effect this will be a work of great difficulty, demanding deep thought and careful enquiry into the habits of life and prejudices of the people.

9. I feel inclined to recommend that a special Commission be appointed to consider how best a general census of Bengal might be taken, and what system of registration should henceforth be adopted. Such a Commission should be composed of four or five carefully selected members, and they should devote their undivided attention to the subject of inquiry for at least three months. The outlay would be of insignificant importance as compared with the advantages to be gained from mature consideration of such a subject.

10. Without a somewhat reliable census of the general population the calculation of accurate death-rates is simply impossible.

11. "In 1836, Baron Dupin, at a meeting of the British Association, dwelt strongly on the national stigma affixed to England by the utter neglect of Indian statistics. He pointed out that different estimates of the Hindoo population under English rule varied to the extent of more than thirty millions; that in short we were uncertain regarding the amount by a number greater than the whole population of Great Britain." (*vide* "Note on the renewal by the Asiatic Society of its Statistical Researches," by S. G. T. Heatly, Calcutta, April 1845).

Perhaps in the present day we may be able to estimate the Hindoo population within a smaller variation of opinion than that represented by *thirty millions!* yet there can be no doubt that as regards actual proof of the existence of many thousands (if not of millions of souls) in this great empire, there is still absolute incertitude. Such unlimited ignorance of "the living forces upon whose direction and intensity the future prospects of society depend, should surely (in these times of deep and searching study into all that can affect the interests of man) be removed with as little delay as possible.

12. I am aware that it is in contemplation to take a census of Bengal in 1871. The present is consequently a most fitting opportunity for the establishment of a regular Indian Registration Department, the formation of which I have had occasion lately to urge on the attention of the Government. I trust that you may see fit to add to this recommendation all the weight of your valuable opinion.

13. Before useful registration can be carried out in India, Registrars paid by the State, must be appointed all over the country. Without this

any money spent on the scheme will, in my opinion, be altogether thrown away.

14. These registrars would require to be under supervision; their books would have to be periodically examined, and they should be fined if they are detected levying fees or otherwise abusing their position.

15. In England, "persons destroying any burial register or making false entries therein are guilty of felony (20 & 21 Vic. c. 81. s. 15) and are liable, at the discretion of the Court, to penal servitude for life, or not less than three years; or to imprisonment, with or without hard labour; or solitary confinement (not more than one month at any one time, or three months in any one year), not exceeding two years."

The Indian Penal Code, Sec. 466, also provides against forgery of a register of birth, marriage or burial.

16. It is, at the outset, an essential consideration, whether the State is prepared to organize and pay for a regular Registration Department. Without this no real good will be effected.

17. The police should nowhere be employed as agents of registration. Such a duty is altogether beyond their proper province.

18. A Registration Act should be introduced whereby it should be rendered compulsory for *zemindars, talookdars* and *putneedars* to report to the nearest registrar, the occurrence of every birth, marriage, or death among their tenants.

19. The information should be immediately obtained by the zemindars from the *tehsildars* or head *munduls* or *prudhans,* who should be subject to fine for neglect of this duty.

20. In different districts the persons who regulate village affairs are, known by different names:—*munduls, paiks, halsanahs, kotwals,* &c., but all these titles are, in point of fact, synonymous (as far as the present subject is concerned.) These individuals go much about amongst the people collect rents, and know of everything that occurs in the villages.

21. I think I would attach a small fine on the *munduls* or their representatives, on the *zemindars* and even on the heads of families if correct information was not supplied. The difficulty would be to levy such penalties.

22. Some are of opinion that *munduls* or *prudhans* should receive a small fee for each domestic occurrence registered by them.

23. Printed forms might be supplied by the Government. These would be sent every month, by the zemindar, to the nearest registrar, or to the Magistrate or Joint Magistrate at every sudder station and sub-division.

In towns the information should be submitted by heads of families within a week.

24. To bring the above arrangements into force, it is evident that fresh legislation must be introduced; without this I do not think any good can be achieved; even with it the practical difficulties will be very great.

25. The chief of these will be the following:—

a. Explaining to the people the object and advisability of the registration scheme.

b. The natural apathy and indifference of the people; the small value they attach to human life: their disinclination to anticipate or avert any physical evil; and their scepticism as to the possibility of any good resulting from human interference or effort in matters affecting life and death.

c. Enforcing the rules laid down.

d. The financial difficulties.

26. No effective system of registration will ever be inaugurated in this country except by a large expenditure of public money by the State and by municipalities.

27. In large towns, municipalities ought to be able to collect fairly reliable statistics.

In the smaller towns, mofussil villages, and districts, the difficulties will be particularly great. Without the assistance and hearty co-operation of zemindars, the whole scheme, as far as the Lower Provinces are concerned, must fail.

28. Perhaps it might be advisable, at first, to limit the working of the scheme to large towns; allowing a knowledge of its mode of operation and objects gradually to reach the people in country districts.

29. With regard to the *forms* of registration which should be adopted, I am inclined to think that, if the scheme is to be established on an extended scale, these should be extremely uncomplicated and simple, and such as would merely afford, in broad outline, a knowledge of the *chief* morbid influences at work throughout the population, and materials for contrasting *in a general way,* the sanitary condition of one district with another.

30. The forms might somewhat resemble the following.*

31. The information collected in these three sets of forms should be carefully compared with meteorological records, and with the average prices of provisions.

32. The information regarding marriages will be the most difficult to obtain. Indeed it is questionable whether this part of the subject should not be allowed to stand over altogether for the present.

33. Information regarding births is regularly noted, in all cases, amongst the Hindoos, the preparation, on the birth of an infant, of the "*jónmo puttro*" or horoscope, never being omitted.

34. The accuracy of the mortuary returns received might be checked by the records of cremation of Hindoos at *ghâts* and elsewhere, and of the actual burial of Mussulmen. Mahomedans ought to have regular burying grounds allotted to them; they should not be permitted to inter their dead wherever they please.

35. It is to be feared that the best arrangements that may be planned for registration in India will be more or less faulty.

36. Even in England the registration of births and deaths is still very defective, it not having yet been rendered compulsory. In Scotland and Ireland it *is* enforced.

37. Again, Great Britain is the only country in Europe where *still-births* are not registered.

38. Dr. Farr is of opinion that "in 17 per cent of the total number of deaths registered in England and Wales no clue is given to the cause of death, and in some districts it is stated upon good authority, that the proportion of uncertified deaths is more than 70 *per cent.*" (*Vide* "The defects of the English Registration of Deaths" by Arthur Ransome, M. B., in the "Transactions of the National Association for the promotion of Social Science," (1867, *p.* 469).

39. Such being the case in England it is very evident that, *a fortiori*, in India to have a reliable registration system, nothing can safely be left to voluntary service.

40. Legal compulsion I believe to be absolutely necessary in such a matter as this.

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* These forms are here omitted, as they have been incorporated by those adopted by the Sanitary Commissioner with the Government of India.—D. B. S.

APPENDIX G.

REGARDING SOME OF THE CHIEF SANITARY REQUIREMENTS OF BENGAL.*

Want of local resources is the one great barrier to sanitary reform and progress in India.

In the case of nine out of ten municipalities in this country, the sanitarian, if he hopefully insists upon any desirable scheme, is met with the reply: "We have not a farthing of money available for such things; under the circumstances it is waste of time to discuss them; we can barely pay our way as it is; we perfectly allow the truth of all you say; we should rejoice to see the results brought about which you allude to; but the simple truth is, our finances are, at the present time, at the very lowest ebb, and we stand a fair chance of being altogether insolvent within a few years." Such is a most common reply from the members of municipal bodies in India; every word of which is but too true.

In the case of small towns, villages, and rural districts, the condition of local finances is even more cheerless than the above. Existing taxation, it may be, is felt severely; the material requirements of the locality are extensive and of an urgent nature; the people are indifferent to the last degree, and helpless; the civil Authorities, few in number, are greatly burdened with a multiplicity of duties; there is no sanitary system; imperial funds, it is said, are inapplicable to such purposes; the local resources are utterly inadequate; and so nature triumphs over man, and Death mows down thousands who would otherwise live and bring prosperity to the land.

When the human loss is very sudden and conspicuous, there occurs a sad and pressing appeal for help, which the Government, listening to with distress, anxiously endeavours to meet, passing orders that the required relief must, for the time being, be afforded, regardless of cost. The immediate emergency thus abates; death has seized his spoil and disappeared; and matters again revert to their former condition, and this, not because the local Authorities are unsympathetic (as a rule, they are sincerely interested in the people,) not because the Government is indifferent in these matters (for such is by no means the case,) but simply because there is an absolute want of available local funds.

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* NOTE.—The following are extracts from a letter addressed to the Government, dated Darjeeling, the 16th June 1869, having reference to a despatch from Her Majesty's Secretary of State for India on the subject of the past history and future requirements of Sanitation in India.

D. B. S.

Viscount Cranbourne, writing in 1866, considered that "the great difficulty of sanitary improvement in India would be, in the first instance at least, its cost." His Lordship recommended, as the first point to be taken up, a careful consideration of the amount and source of the funds that could be made available for sanitary purposes.

This recommendation strikes at the very root of the subject; and it still urgently demands attention.

Until it is determined from what source money is to be derived for the purpose of guarding public health, sanitation in India will be merely an empty name.

It remains to be considered and settled how the disposal of general and local revenues can be so modified as to furnish funds for outlay on much-needed sanitary inspection, supervision, and executive action. This is the point of by far, the greatest importance now pending.

As soon as an adequate sanitary fund is available in each town, village and district, it will be a most easy matter to suggest, for establishment, an organization by means of which infinite good will be effected.

Many of our Indian municipalities, in my opinion, require complete remodelling.

They should be more closely controlled by the Government than they are.

Their monthly proceedings should be forwarded to the Government for publication in the *Official Gazette*. In this way it would be known what all were doing ; and the successes or failures of one place would prove instructive elsewhere.

The usual municipal establishments for sanitary inspection and supervision are altogether faulty; skilled labour and advice is, if not almost unknown, deficient ; a great deal too much is left to hap-hazard ; what is the professed business of many, very frequently resolves itself into the actual work of none.

Self-government in India, however productive of good it may be in other respects, has sadly little to show in the health department.

I am almost inclined to think that were all the municipalities in India abolished to-morrow, actual benefit would result to the people, in a sanitary point of view. At present there is a show of security with very little of its reality. A Sanitary Department in each city and district, working under the immediate supervision of special sanitary officers, and under the direct control of the Government, would effect infinitely more good than our present

Municipalities, which are composed of very heterogeneous elements, for the most part altogther unsuited to the carrying out of the principles of modern sanitary science. The health and cleanliness of small Indian towns and villages is a still more difficult subject to deal with. Such places are only seen and reported on when the Commissioner of Division, the Magistrate, the Joint Magistrate or the Sanitary Commissioner happens to visit them, which cannot be very frequently. Here again, as in the case of large towns, the only way of ensuring a system of general sanitary supervision is to have a special establishment both for inspection and control.

There should be a Health Officer in each district and in every large town.

Were a Health Officer appointed for each District, his duties would consist of constant Sanitary inspection and he should submit a short report, monthly, directed to the Sanitary Commissioner, a copy being at the same time sent to the Magistrate of the district.

These reports would be regularly forwarded, with remarks and suggestions to the Government.

A district Health Officer should carefully and minutely describe the sanitary condition of localities, report on the causes and extent of prevailing disease, detail all the particulars bearing on the appearance and course of epidemics in different parts of his district, familiarize the people with general sanitary principles, translate and expound simple rules to them, advise without delay as to what is most urgently required in the remoter parts of the district, and possibly regulate measures of medical relief. He should further have to work out, at his leisure, the medical topography of the district; prepare charts, displaying the prevalence and direction of excessive sickness and mortality; and report on subjects such as the disposal of the dead, water-supply, drainage, &c.

When it is borne in mind that the regular station-duties of a Civil Surgeon are scarcely, if at all, inferior in importance to those of a Magistrate Collector of Revenue, or a Judge, and that the average area of an Indain District is " somewhat larger than that of Devonshire " (Chesney's " Indian Polity" page 178.) with a population of something like a million of souls, it can scarcely in reason be expected that Medical Officers of stations can ever prove effective district sanitarians. The thing is simply and utterly impossible, as must be well known to all who appreciate the importance and difficulty of broad sanitary measures. Again, it would, of necessity, require many years before a Sanitary Commissioner (however great might be his working capabilities) could by himself possibly bring together a precise knowledge of all the districts of a province.

In my own case, my duties extend over some thing like 200,000 square, miles, from the frontier of Arracan almost to Benares, from Cachar in the east to Bundelcund in the west, and from the boundary of Ganjam and the basin of the Mahanuddy in the south west to the snows of Sikkim.

It would be foolishly presumptuous in any man to suppose or pretend that he could alone make himself familiar with and regulate all the sanitary and insanitary details of so vast a country. It is only by extensive co-operation that public duties of such importance and magnitude can be compassed. I believe the day will come when the regulation of such matters will be regarded as among the most momentous considerations involved in the civil administration of India.

At present, what is greatly wanted, is the appointment of a special Health Officer for each district and large city, whose salary and travelling expenses should be met from the funds of the district itself.

Unhealthy ground conditions and faulty water-supply are probably the two greatest causes of disease in Bengal.

The first is to be met by (*a*) careful engineering surveys; (*b*) by attention to natural drainage outlets; and (*c*) by sub-soil drainage, where this is feasible (which under existing circumtances it can scacely be immediately where rice cultivation is practised.)

I have heard it said, " so long as Bengal is a rice producing country, so long will it be futile to talk of its being thoroughly drained." It remains for engineers to shew whether this is inevitably true, or not. I do not myself believe it to be so. It is perhaps not too much to expect that, by engineering works, fields might be deluged with water to any required degree, which water, when no longer required, might effectually be carried off, and so prevented from stagnating and water-logging the soil.

Wherever subsoil drainage is effectually accomplished, in this as in every other country, the good results, in a sanitary point of view, must be conspicuous, the ground conditions being so rendered healthy instead of poisonous and deadly as at present obtains around every village in Bengal.

Detailed engineering surveys of each district are at present generally required. In the past it seems to have been nobody's business systematically and regularly to record the varying levels of land and water throughout Bengal. With relation to health this is a duty of prime importance, and it ought hereafter to be carefully provided for. Special Officers should be told off for such duty.

The Executive Engineers of stations, with the amount of work which they are now required to attend to, cannot reasonably be expected to furnish surveys of the plains and rivers throughout their districts.

A general sanitary survey of Indian cities yet remains to be worked out.

With this object each city should be divided into blocks, and villages should be considered in groups. For the accomplishment of this I would presume to suggest that I should have a personal Assistant or Secretary, and that one or two Health Officers and one or two conservancy Inspectors should be placed under my immediate orders. I think the expense of such an arrangement might be met from Imperial resources.

Liberal travelling allowance would also have to be provided, for at present, my efforts are much crippled from the want of skilled assistants and subordinates.

Engineers in India will accomplish a great work when they shall suggest measures whereby a wholesome water-supply will be everywhere available.

A scheme having such an end in view must be such as to baffle all the lazy and dirty habits of the people. The great problem here involved is simply enough stated, yet most difficult indeed of accomplishment. It is this: How to bring, within easy reach of the villages of Bengal, water both for bathing and drinking purposes, which, by being in constant motion or otherwise, will remain uncontaminated.

At present the pollution of tanks and indeed of all sources of water, used for cooking and drinking purposes in this country, is not to be described in words. One must have seen the ineffably filthy sources of supply alluded to, to realize the danger they entail to human life.

The careful covering of tanks, so as to protect them from outward contamination, is sadly neglected where it is most urgently required. Indeed the reception and storage of water in India is, for the most part, left altogther to chance, and yet it is common to hear indiscriminate abuse of the country on account of its high death-rates. To the physiologist and the sanitarian, there is an evident and close connection between the culpable neglect on the one hand, and the retributive evil on the other.

In the letter No. 2578, from S. C. Bayley, Esquire, Officiating Additional Secretary to the Government of Bengal, to the Secretary to the Government of India, Home Department, dated Fort William, the 26th May 1868, the following passage occurs:—

> "It is nearly certain that in many districts there is a great deficiency of wholesome water. This deficiency, it is generally possible to supply by the construction of good tanks. But to do this, either the Health Officer must be furnished with a large command of public money or the Government must be armed with legal authority to call on the inhabitants of a village, and on those who receive the rent of the land to which the village appertains, to contribute in their proper portions to the cost of the necessary work."

The latter arrangement is that which should be adopted.

The most urgent and immediate want of Bengal villages, is the want of wholesome water.

One good tank at least should be kept clean in each village. It should be the duty of sub-divisional and district officers to see to this. No part of their official work can be more important. They must be armed with distinctly defined legal authority, and pressure must be put on the people; without all this nothing can be done.

A certain amount of encouragement might be held out to landholders, by partial remissions of revenue, as a reward for action taken to ensure a good water-supply, and, generally, for the removal of local sanitary evils.

It is well worthy of consideration whether rain-water could not be collected in reservoirs supported on masonry structures, so raised above the surrounding ground level, that the water might afterwards be distributed by gravitation. This is referred to at page 12 of the "Suggestions."

There is, in my opinion, too much sinking of water in India. The higher it can be stored, the better will it be, as a rule.

The careful puddling of the bottom and sides of tanks does not receive sufficient attention in this country.

It is to be hoped that in time drinking fountains and filters will be accepted and made use of by the people. The difficulties here encountered are, it is to be observed, not so much of a physical as of a social and moral nature.

The subject of the analysis of water at different stations has within the last two or three years attracted very considerable attention throughout the Bengal Presidency. Very much still remains to be worked out in this respect

A beginning has been made, (and so far very creditably) but no more. The records are infrequent and far too scanty. Points of the deepest scientific interest hinge upon such analysis.

It is to be hoped that Government will cause this special department rapidly to expand.

If a monthly report could be obtained on the water-supply of the chief cities of Bengal, a great step in advance would be made.

The subject of meteorology has latterly attracted considerable notice in this country, and the Government has been by no means idle in this direction.

The Meteorological department will doubtless go on increasing and in due time it must be more closely associated, than it is at present, with broad Sanitary considerations in this country.

The quarterly reports of the Registrar General of England contain the meteorological records for the period under review, as also returns as to the state of crops, the price of provisions, &c. This principle ought to be adopted in Bengal as soon as a system of reliable mortuary registration is fairly in operation.

The subject of sewerage and disposal of night-soil in India, I have lately discussed at length in my "Report on the drainage and conservancy of Calcutta." It is therefore, unnecessary for me to repeat my opinions here.

Speaking generally, under-ground sewers and "the water carriage system" will, I believe, be found to be unsuitable for India. What is particularly required in large cities is the most complete and constant scavenage, and the scientific agricultural utilization of night-soil, at a safe distance from the place of its collection.

Municipalities should, on all sides, set the example of carrying out such measures. When the natives have seen them to be practicable, simple and even remunerative, the opposition to them which now exists will gradually disappear.

In connection with what has lately been done for (and in) India regarding sanitary matters, it is a very noteworthy circumstance that, on the 12th of December 1868, two most distinguished young Medical Officers, from Netley, left England, under the auspices of the Home Government, with the view of prosecuting certain special investigations regarding the causation and propagation of cholera in India.

Drs. Cunningham and Lewis, before their departure from England, with the approval of and under instructions from the Secretaries of State for War and India, visited Halle, Jena and Munich, being accredited to eminent men of science in those places, who were good enough to make as clear as possible their own views on the subject of the origination of cholera.

The fact of these talented young officers being sent out by the State, on special duty, to investigate all the bearings of such opinions as are attracting the attention of men of science throughout Europe, testifies to the deep interest which the English Government takes in such matters.

Dr. Max. V. Pettenkofer, the distinguished Professor of Hygiene at Munich thus wrote on the subject on the 15th of November 1868:—

"This undertaking reflects honor on England, in the estimation of the whole human race."

Drs. Cunningham and Lewis have before them a grand enquiry, and it is to be hoped that their researches will throw light on the profound subject with which they have to deal.

Their observations will be directed to the physical ground-conditions and the organic processes corresponding to the appearance and non-appearance of cholera, *i. e.*, to the geological characteristics of localities; the temperature of the soil at various depths; rain-fall; ground-water levels at different times; chemical analysis, and microscopic examination of water from different sources; the investigation of animal and vegetable organisms in the soil, at different depths; the study of epiphytics or vegetable blights; and the true significance, in relation to cholera of fungi on cereals, such as rice, the staple article of food throughout the Lower Provinces of Bengal.

The results of such observations, whether they afford positive or negative evidence in relation to the theories of certain distinguished German philosophers, must be of great general interest and value to science.

The observations now referred to have already commenced, and I have had the pleasure of conversing with both the enquirers on the general topics which will engage their attention, and on their future plan of operations. It will be a source of much gratification to me if, by advice or assistance, I am able in any way to further or facilitate their future proceedings.

The Hon'ble Mr. George Campbell, late Chief Commissioner of the Central Provinces, in a Minute, dated Nagpore, 10th March 1868, made the following remark: "*The well-being of the country depends on the question,* whether we can trace the causes of cholera, and mitigate its effect." This is very true; hence the deep importance of the mission on which Drs. Cunningham and Lewis are now engaged, with the interest and good wishes of men of science to encourage them, and with all the enlightened and ready support of the Government of this country urging them on to the acquisition of valuable knowledge.

Part I.

GENERAL REPORT.

Recent Sanitary Administration in Bengal,—outline of.

As a result of the recommendations of the Royal Commission appointed to enquire into the sanitary state of the Army in India, in May 1859, the Sanitary Commission of Bengal was instituted in 1864.

To it the general direction of all sanitary measures throughout the Presidency was entrusted.

At the close of 1865, the Bengal Sanitary Commission was altered in its constitution, and was, from that time, represented by a single Sanitary Commissioner and a Secretary.

Writing in 1866, the Governor-General in Council was of opinion, that the time had come for establishing a system which should ensure constant attention to the requirements of the public health throughout India, (*vide* Minute by His Excellency the Right Hon'ble the Governor General of India, concurred in by the other Members of Council, dated 9th January 1866.)

The two following extracts are taken from the Minute here referred to:

" The reasons which led to the appointment of Sanitary Commissions in the three Presidencies are well known. The primary object which the Government had in view, was the improvement of the sanitary state of the army, but it was obvious that this object could not be fully attained unless measures were also taken to guard against the numerous removeable causes of disease which almost everywhere exist outside the limits of our cantonments. It was impossible suddenly to create the machinery for carrying out all that was required, not only for the immediate protection of the health of the troops, but for the care of the public health generally. It was desirable to proceed gradually, and to learn, by experience, what was the character of the measures which ought to be adopted. I consider that this experience has now been gained, and that the time has come in which the Government ought to take further steps for establishing a system which shall ensure constant attention to the requirements of the public health throughout India, and shall provide the means of carrying into effect the more important practical measures of sanitary improvement, "In respect, therefore, of sanitary improvements among the civil population, the essential thing is to provide the local Governments and Administrations with the necessary machinery."

It was evident that with such a purpose in view some special organization was necessary. At first it was proposed to appoint the Inspector General of Prisons to be principal Health Officer in each province.

Later, it was under consideration whether such duties should not be assigned to the Inspector General of Hospitals.

After a time both these propositions fell to the ground, and it was determined to have separate medical officers in charge of the sanitary arrangements of each province, to be placed entirely under the control of the chief Civil Authorities. The following extract from the Despatch of the Government of India, No. 152, dated the 16th August 1867, to the Right Hon'ble Sir Stafford H. Northcote, Bart., then Secretary of State for India, affords the reasons upon the strength of which this Resolution was come to:

1. "We have given our attentive consideration to the subject of your Despatch No. 40, dated the 30th April last, regarding the establishment of a system for the supervision of the public health throughout India, and the means by which such a system may most effectually be carried out. We have experienced considerable difficulty in devising these arrangements; for it appears to us that, if anything like an effective sanitary administration is to be really introduced, a special organization will be required to produce the ends in view, and that its organization must be thoroughly harmonized with that of the general civil administration of the country, and be immediately under the control of the chief Civil Authorities. A double system, whereby these arrangements would be partly under the authorities and partly under the Inspector General of Hospitals in each province, who is identified in a great measure with the military administration, would create difficulty and delay, if not obstruction, and would paralyse all real improvement.

2. "For these reasons the Governor General proposed in his Minute of the 9th January 1866, that, as a rule, the Inspectors General of Jails should be the sanitary officers of provinces under the Lieutenant-Governors and Chief Commissioners, and that Bengal should be divided into two circles, each with an Inspector General invested with the double duty. This proposition was adopted by the Government of India, and was submitted to Her Majesty's Government with our Despatches noted on the margin.

Financial—To Secretary of State, No. 13, dated 22nd January 1866.

Military—(separate)—To the Secretary of State, No. 121, dated 2nd June 1866.

3. " Your reply is contained in the Despatch under acknowledgment, in the 7th paragraph of which you communicate your opinion "that the Inspectors General of Hospitals, having under them in direct official subordination the Deputy Inspectors, would be better fitted than the Inspectors of Jails for the position of principal Officers of Health." You request our consideration of this proposition, and leave the matter to our decision.

4. " We have already observed that we consider a special organization necessary to the introduction of an effective sanitary administration; and in our last communications on this subject, we have received from several of the local Governments and Administrations opinions adverse to the employment of the Inspectors General of Jails to superintend sanitary measures, on the ground that the time of these officers is already fully occupied by their proper duties. On the other hand, we feel quite convinced that the delegation of this duty to the Deputy Inspectors General under the Inspector General of the province will fail in producing the desired result. No real progress will, we fear, in that case, be made. The primary duties of these officers, as has been above indicated, are of a military character. They are the supervisors and controllers of the medical officers attached to the Native Army, and therefore practically, though not nominally, work under military jurisdiction. They are also, as a rule, selected to a considerable extent on the principle of seniority coupled with good service, and therefore in many instances are not in the prime of life, and do not usually possess that activity and energy which will be essential to the effective introduction of the principles of sanitary science generally in India.

5. " Bearing these considerations in mind, but desirous to make the new arrangements as little expensive as practicable, our first idea was to reduce the existing medical circles and set apart a certain number of the Deputy Inspectors General for the military duties in these enlarged circles, to keep the remainder at our disposal for special sanitary work, supplementing them by medical officers selected for the duty. But a difficulty has occurred in working out this arrangement, *viz.*, that it is desirable to have a medical officer of the rank of Deputy Inspector General, or at least of Surgeon Major, with each separate division of the army as the medical adviser of its Commander.

6. " This being the case, we have come to the conclusion that, on the whole, it will be expedient to have separate medical officers in charge of the sanitary arrangements in provinces selected solely for their ability and general fitness for these duties, and placed entirely under the control of the chief Civil Authorities, subject only to the general control which the Governor General in Council exercises over those authorities. These medical officers

would, of course, be selected from the general list of Surgeons Major and Surgeons of the Medical Service of Bengal, and be eligible for any appointments which pertain to the service.

7. "And we may observe that it has come to our knowledge that the general opinion of those who are considered in England best skilled in sanitary matters, is that separate sanitary officers are essentially necessary for the effectual accomplishment of the desired object."

This Resolution was approved of by a telegram from Her Majesty's Secretary of State for India, dated the 29th November 1867, and afterwards by a despatch dated the 30th of the same month.

In the beginning of 1868, Sanitary Commissioners were appointed for Bengal, the North-Western Provinces, the Punjab, the Central Provinces, Oudh, and British Burmah.

The Sanitary Commissioner of the Bengal Presidency then assumed the title of "Sanitary Commissioner with the Government of India," so as to distinguish him from the local officer attached to the Government of the Lower Provinces of Bengal.

The proposed duties of the Sanitary Commissioners of Provinces were indicated in a letter No. $\frac{9}{681}$, dated Fort William, the 12th February 1868, from E. C. Bayley, Esq., Secretary to the Government of India, Home Department.

This communication was submitted to the different Governments for review. My general views on this subject were submitted to the Government of Bengal in a letter to the Officiating Secretary to the Government, dated Calcutta, the 20th April 1868. The letter referred to is Appendix A.

A subsequent Resolution of the Government of India in the Home Department, No. 128, dated the 10th September 1868, after a re-consideration of the subject, determined anew, in a general way, the nature of the duties to be discharged by the Sanitary Commissioners,—somewhat modifying the previous orders of the 12th February 1868.

All further details were left to be disposed of by the Local Governments and Administrations.

In a letter No. 5217, dated 31st October 1868, I was directed by His Honor the Lieutenant-Governor to submit any observations I might have to offer on any of the matters treated of in the Resolution last referred to. A letter in reply was accordingly addressed to the officiating Under-Secretary to the Government of Bengal, (dated 4th November 1868.) It is given as Appendix B.

The above affords an outline of the latest administrative changes in the Sanitary Department of Bengal, and of the more important parts of the correspondence which passed on the subject.

Necessity for co-operation on the part of Civil Surgeons.

* 1. No. 2581, dated 26th May 1868, to the Inspector General of Hospitals, Lower Provinces.
2. No. 3046, dated 20th June 1868, to all District Medical officers in the Lower Provinces.
3. No. 5316, dated 6th November 1868, to the Inspector General of Hospitals, Lower Provinces.

In Appendix C. will be found three letters* in which the Government insists upon the necessity of co-operation on the part of all Civil Surgeons.

Assumed charge of appointment, 31st March 1868.

I assumed charge of my appointment on the 31st of March 1868, some delay having occured in consequence of my being in medical charge of the hill sanitarium of Mussooree in the North-Western Provinces.

Submission of questions on sanitation.

On the 19th May 1868, I submitted to the Government a form of questions on sanitary subjects, for circulation to Civil Surgeons. These, with the forwarding letter, will be found in Appendix D.

Reports received.

In reply to the questions circulated, forty sanitary reports have been received from the following places: (*vide, Part II.*)

1.—Bhowanipore.
2.—Howrah.
3.—Hooghly.
4.—Nuddea.
5.—Jessore.
6.—Furreedpore.
7.—Dacca.
8.—Mymensingh.
9.—Burisaul.
10.—Noakolly.
11.—Tipperah.
12.—Kooshteah.
13.—Pubna.
14.—Berhampore.
15.—Rampore Beauleah.
16.—Maldah.
17.—Rungpore.
18.—Julpigoree.
19.—Darjeeling.
20.—Burdwan.
21.—Cutwa.
22.—Bancoorah.
23.—Raneegunge.
24.—Beerbhoom.
25.—Rajmehal.
26.—Deoghur.
27.—Bhaugulpore.
28.—Monghyr.
29.—Purneah.
30.—Gya.
31.—Patna.
32.—Tirhoot (Mozzufferpore.)
33.—Chumparun.
34.—Purulia (Maunbhoom)
35.—Hazareebagh.
36.—Chyebassa (Singbhoom).
37.—Midnapore.
38.—Balasore.
39.—Cuttack.
40—Pooree.

Reports not received.

Reports have *not* been received from the following places :—

24-Pergunnahs.
Serampore.
Chittagong.
Cachar.
Sylhet.
Bograh.
Dinagepore.
Shahabad (Arrah.)
Sarun (Chupra.)

I shall presently allude to the contents and relative merits of the forty reports which have been received.

Issue of Village Conservancy Rules.

One of the first subjects which engaged attention after my appointment was *village conservancy.*

A set of simple rules on this subject was compiled in the Bengal Secretariat, after a review of somewhat similar documents issued in the North-Western Provinces, the Punjab, the Central Provinces and other parts of India. They were revised by Mr. Stuart Bayley, Additional Secretary to the Government—and afterwards by myself.

These Village Conservancy Rules are given in Appendix E.

They were laid down as standard hints rather than as an exact index of the amount of sanitary reform which can reasonably be expected to be carried out at once. If the Commissioners of divisions, Magistrates, and other local officers will use their influence to enlist, in the cause of sanitation, the sympathies and assistance of landholders, and if the latter will cause to be published and explained such regulations, in the village *punchayets,* and threaten with their displeasure those who neglect them, it is not improbable that some good may come from the issuing of these rules. By personal influence there is no doubt that a good deal can be done in this direction. All the rules will certainly not be acted up to; this is not to be expected; yet some of them may be adopted. In any case it is but proper that the Government should inform the people as to what is really requisite and right. I have heard it frequently said "the people will never act up to such ideal regulations," and I myself am not at all sanguine that they will do so at once; yet there can be no doubt that a proper standard ought to be kept always before them, so that they may no longer say, "we are ignorant of what is wanted." Simple facts must be explained to them in a simple way; afterwards a certain degree of firmness must be exercised in such matters, such as an Asiatic, and more particularly a Bengali, requires ; the rest must be left to time. It would be of no avail to try to frighten the simple people of this country with long scientific names. " Registration," " Zymotic disease," " Carburetted Hydrogen," " Pyrexial disorders," "refuse organic matter," "deodorization," " hygeiology" and Medico-sanitary considerations generally are profound mysteries to them. They must be rendered simple, and put kindly before them, else they will never understand them.

Pilgrimage reported on.

The subject of *Pilgrimage* soon came to engage my attention and interest. I visited Pooree-Juggernauth during the festival of the *Ruth Jatra,* and afterwards inspected the chief stations of Orissa. My report on these subjects is with the Government. I anxiously trust that some action will yet be taken with regard to the substance of that report. The subject imperatively demands close attention, and it cannot with safety be set aside.

Conservancy of Calcutta reported on.

Before the end of the year now under report, I was directed to enquire into *the best mode of disposing of the night soil of Calcutta.* I went into the subject with care, and although my report was not submitted to Government until after the commencement of 1869, it was chiefly based on observations made during the past year. That report being now before the public further mention need not be made of it.

The education of Boids and Hakeems, and schemes for medical relief of the people.

Another matter regarding which I was required to express an opinion was the subject of a good scheme for *the medical relief of the people,* and the possibility of educating so-called "indigenous Doctors." Three letters addressed to the Government* contained my opinions on the subject in general, but chiefly regarding schemes proposed by Mr. Chapman, Major Mercer, and Doctor Bholanauth Bose. The 3rd letter was written during the current year, but it refers to matters which were elaborated in 1868.

Preparation of a hand-book regarding the dangers of small-pox and the virtues of vaccination.

A set of " *Rules to be observed on outbreaks of epidemic small-pox*" was submitted to me for review. In a letter dated the 23rd November 1868, I carefully considered the different bearings of this subject, and pointed out what precautions should be taken both by the people and by the officers of Government. This document was necessarily of a somewhat critical character. Its submission led His Honor the Lieutenant-Governor to direct that a small hand-book containing information, put in the simplest form, for the information of the people, on the subjects of small-pox, vaccination, inoculation, and precautionary measures generally, should be compiled. This could not be prepared in 1868; but the work has now been completed, and will no doubt soon be made public. It is likely to prove of considerable use, as nothing of exactly the same description has yet, so far as I know, been circulated in this country.

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* 1. To Junior Secretary to Government of Bengal, dated 11th May 1868.
2. To Junior Secretary to Government of Bengal, dated 23rd May 1868.
3. To Junior Secretary to Government of Bengal, dated 5th June 1869.

Regarding a system of Mortuary Registration.

It became necessary to consider *the Mortuary Returns of Bengal* for 1868. Regarding those which were submitted to me, several letters were addressed to the Government.

The Sanitary Commissioner with the Government of India having referred to me on the subject of *a uniform system of registration of deaths suitable for introduction throughout the Bengal Presidency,* my reply was embodied in a letter No. 95, dated 7th December 1868, which will be found in Appendix F. In the proceedings of the Sanitary Commissioner with the Government of India for the month of February 1869, the whole subject is very carefully gone into. Forms and Statements have been drawn up and rules suggested which are of much value.

An analysis of these rules and forms was lately submitted by me, and their adoption recommended in Bengal.

The returns in these provinces will certainly not be very accurate (probably for a long time to come,) yet contrasts will be established between returns of different dates, whereby a useful index will be furnished to the sanitarian of the varying ratios of sickness and death in given circles and districts. It is to be hoped that a uniform system will ere long be at work. The Government has now devoted much attention to the subject. The utter want of value of all mortuary returns, as they are now prepared throughout Bengal, has been carefully brought to the notice of His Honor the Lieutenant-Governor.

Regarding the past history of sanitation in India.

On the 4th of August 1868, a report was called for on the subject of the *progress made in sanitation in India,* (since the subject first attracted the attention of the Government,) and regarding *the measures that can be taken in regard to sanitary works required for improving Indian stations.* The reply could only lately be submitted to the Government. From it, suggestions on some of the chief sanitary requirements of India will be found in Appendix G, under the following heads: want of money, weakness and inefficiency of municipalities ; ground conditions and necessity for engineering surveys and drainage; water-supply; chemical analysis meteorology; conservancy ; cholera enquiry, &c.

General allusion has been made above to some of the principal reports called for by the Government during 1868.

Stations visited, &c.

My first tour was through Orissa, and I have already reported, in a general manner, on the stations of Pooree, Cuttack, Balasore, Midnapore, &c.

I also visited Berhampore, Moorshedabad, Rampore Beauleah and Dacca. The result of enquiries made there will be found incorporated in my remarks on the sanitary reports from those places.

Considerable time was also devoted to questions of special conservancy connected with Calcutta and its suburbs, regarding which a report was called for, which has already been referred to. The conservancy of Barrackpore was reported on at length; and a report was also submitted as to the suitability of a proposed site for a jail paper-manufactory at Bali.

Reports and Records received, &c.

Copies of all sanitary reports, records and returns of importance are received from the Bengal Office, by order of His Honor the Lieutenant-Governor. Also the *Calcutta Gazette*, the weekly report on native papers, &c., &c. Books and reports were also received on application, from the Home Office library; and maps of the Bengal districts from the Surveyor General's office.

A set of Meteorological instruments was also supplied by Government.

A complete set of the reports and published Proceedings of the Sanitary Commissioners of Bengal, Bombay and Madras have been received.

A special grant sanctioned for a library of special reference.

Application was made to the Government for a Library of special reference on sanitary science. A list of standard works was submitted, that they might be ordered from England. The Government was pleased to sanction a special grant of Rs. 2,000 for the purchase of such works (exclusive of £42, the cost, in England, of "*Les Annales d'Hygiène.*"). Messrs. Churchill & Sons were communicated with on the subject, and their first instalment of works on public health, conservancy, vital statistics, drainage and the like, has been received; the rest are now on the way out. It is worthy of note that Sir Ranald Martin was kind enough to lend Messrs. Churchill & Sons his valuable advice as to the works which should be sent to India.

Press work.

Press work connected with this office has been executed in the Bengal Secretariat Press, with the exception of my Orissa report which, from its length, had to be printed in the Calcutta Central Press.

Postal Regulation—Franking of letters.

Franking of letters, &c.—Hitherto this office has not been a privileged one; but by the new postal rules which are to come into force from the 1st October 1869, it will hereafter be privileged.

Expenditure.

The total regular expenditure connected with my appointment and office, for the last nine months of 1868, has been as follows :—

		Rs.	As.	P.
Salary 1,500 × 9	=	13,500	0	0
Salary of clerks 100 × 8	=	800	0	0
Office rent 100 × 9	=	900	0	0
Office furniture	=	50	0	0
Menial servants, contingencies, &c.	=	189	3	4
Total,		15,439	3	4

Travelling and Office Allowance.

By a Resolution published in the Proceedings of the Government of India in the Financial Department No. 3416, under date Simla, the 5th November 1868, the Governor General in Council was pleased to rule that the travelling allowance of each of the Sanitary Commissioners of provinces, shall be the same as that of the Inspector General of prisons in the same province. His Excellency in Council was also pleased to sanction experimentally, subject to report after a year, the following scale of office establishment (for Bengal.)

	Rs.	As.	P.
Head clerk	150	0	0
Second clerk	80	0	0
2 Chuprassies, at 5 each	10	0	0
Total, Rs.	240	0	0

Part II.

LOCAL SANITARY REPORTS

OF

CIVIL SURGEONS FOR FORTY DISTRICTS

EDITED BY

SANITARY COMMISSIONER.

Part II.

Selected Extracts from the Reports of Civil Surgeons.

1.—BHOWANIPORE.

THE REPORT IS BY BABOO RAM CHUNDRA SEN.

"Much clearing of jungle and brushwood and filling up of ponds and ditches are necessary to make Bhowanipore a healthy place.

"The southern portion of the Suburb is said to be the cleanest. At Bhowanipore is the celebrated shrine of Kalighaut to which worshippers resort from most parts of the country."

"The subsoil water is found at an average depth of 14 feet. The natural surface drainage is not very good. *Kutcha* drains are found by the side of the roads; these are not sloped; water stagnates in them, and is only carried off by heavy rainfall. The poorer classes of the people ease themselves on the banks of the pools in which they bathe. The water of many such pools is highly offensive; the people commonly urinate in the water whilst they bathe."

Under the head of sanitation and conservancy the Sub-Assistant Surgeon writes in the following forcible terms:—

"The general sanitary condition of Bhowanipore is not good, there are many places which are not passable on account of the stink of dung, urine, and human filth. I have passed through some places and I was very nearly being suffocated with the filthy smell; all the roads are not clean, and the small lanes are dirty enough to make one sick. The drains are deep, the refuse water of the houses is emptied into them and stands there so long without the least notice being taken by the road overseers. Many small lanes become inaccessible in the morning on account of the excrement being found strewed on them, and it is owing to the people easing themselves during the night. During the rainy season such streets and the lanes become quite impassable; most of the roads are in very bad repair, dead dogs, cats, rats, and the bodies of other decomposed animals, are always found on the sides of the streets. At one time I found the decomposed body of a dog was lying on the main street for upwards of 48 hours and nobody took any notice of it.

"The suggestions that I can offer are, that the small lanes ought to be enlarged; that shallow surface-drains ought to be constructed on either side of the roads with a perceptible slope; that the several dung heaps and pools ought to be removed; that cow-sheds ought to be scattered, and not more than two or four cows allowed to remain at a place; that no cobbler should be allowed to macerate hides within the town; that the main roads should be watered daily to prevent the dust from rising; that no accumulation of filth be allowed to remain within the privies; that the burning Ghaut be removed to a considerable distance from the town; that no carcasses be thrown in the drains or on the streets, and allowed to remain for a long time.

"All the low uncultivated lands ought to be filled up.

"People indiscriminately bathe in all the tanks about the place. Washing of clothes is also allowed; in fact the *dhobee's* board is found on the bank of almost all the tanks. The drains that pass by the sides of the tanks are very filthy; in fact they are the privies of those who do not have privies in their houses."

DWELLINGS, STREETS, &c.

"The ordinary dwellings here are anything but comfortable. The houses are small, low, and ill-ventilated, the lower floors are quite damp, the windows in the lower rooms are few and far between, the floors are mostly *kutcha*: the water in some is actually oozing out; the walls are damp, and in some the dampness has risen to a considerable height.

"The *konjee*, produced from the boiling of rice for daily consumption, in a decompased state, is allowed to run into the drains, or it accumulates inside the house.

"The lower rooms are generally used for cooking purposes; consequently the smoke, not finding any outlet, spreads all over the house, and makes the lower apartments quite dark and gloomy. I may mention that the Hindoos are in the habit of washing the floors of their houses daily, the water is allowed to sink into the floor which necessarily makes the house damp. In some houses that I have seen the light of the sun never penetrates into the lower apartments.

"The upper floors in some are dry, but not airy for want of proper ventilators; houses stink of urine so horribly, that it becomes quite suffocating to those who are not accustomed to breathe the noxious atmosphere. I have been professionally called by many, and have been so much disgusted with some, that I would rather not attend the sick in such houses, if I had an option left me in the matter."

The Baboo states that during the rains some houses are quite inaccessible from stagnation of water in front of them, the drains having no slope. The following remarks follow :—

" The plan of drainage of Bhowanipore is nothing better than no drainage. The drains on both sides of the roads, streets, and lanes are *kutcha* ; their bottoms are not paved, but are dug yearly according to the fancy of the Dhangurs, consequently some places are deeper than others, and in these deeper spots, the ejected waters of the house collect and sink ; in the rainy weather only they are full, when the waters run out ; otherwise they stagnate and remain.

The depth of the drains varies at various places ; in some two feet, in others three feet, others again a foot and so on. They are annually visited by the overseers, and are nominally cleaned ; I have often seen drains filled with plantain and other leaves and some times with human excrement.

I will just mention about a covered-cross drain I happened to pass by, about two weeks ago, which was laid open half way, and to my great astonishment, I found it filled up with filth of all descriptions from top to bottom in its whole length. The diameter of this drain was about four or five feet and the whole of it was completely filled up with filth which must have accumulated from time to time, and it appears to me that it had never been cleaned out since the arch across the road was constructed."

I give the following terrible picture in the Baboo's own words, unaltered.

" The private privies in general use, are demi-upper-roomed ones, on the floor of which there are two holes on which the people sit, and allow the excrement to fall into the room below it, where it is allowed to accumulate ; some of them are cleaned out every two or three months ; others again annually ; in the rainy season especially, the filth is poured down on the roads and into the drains after heavy showers of rain, when the drains overflow and make the passers by most miserable.

The dry-earth system is not adopted.

Trenches are never dug in this place for the reception of ordure ; sometimes the excrement is thrown into the river, more particularly in the dry season, but during the rains, as I mentioned above, it passes into the drains.

The excreta of sick persons are thrown indiscriminately on the plains and into the drains. I have repeatedly instructed the people to cover the excreta of cholera patients particularly, but very few attend to such directions."

The following are the Jail Returns:

Daily average number of prisoners in Jail ..	141
Ditto Ditto of sick ..	8
Ratio of sick to strength	5·217
Ditto of mortality to strength	0·135

Leprosy and elephantiasis are both said to be rare in the district.

The climate is unfavourable for those of a scrofulous or phthisical diathesis.

The population is estimated at above 5,64,000 (including children). This estimate is believed to be moderately reliable.

" There is no regular registration of births and deaths for the town of Howrah; the population has greatly increased during the last eight years, owing to the greater demand for labour on Railway-works, in Mills, &c."

The population to the square mile is about 1,025.

On an average the sub-soil water is found at the depth of about twelve feet from the surface.

The drains which used to empty themselves into the river are now partially blocked. As a consequence, after heavy rain the low ground around is swamped."

METEOROLOGY, &c.

The average monthly temperature and rain-fall for the year 1868 is as follows:—

		Thermometer Highest.	Thermometer Lowest.	Mean of all the highest.	Mean of all the lowest.	Rain.	Winds.
January	..	75°	60°	72°	64°	10'0	N. S
February	..	82	62	75	69	0-0	N. E
March	..	89	69	83	75	0-2	S. N
April	..	92	72	84	78	3-5	S. E
May	..	92	77	85	81	7-1	S. E
June	..	91	79	86	83	30-4	S. E
July	..	88	81	84	83	14-8	S. E
August	..	90	80	85	83	25-3	S. E
September	..	87	80	85	83	21-3	S. E
October	..	87	75	83	79	0-6	S. N
November	..	82	68	78	72	0-0	N. S
December	..	76	62	68	66	0-0	N. S

" The Barometer and Hygrometer are not in use in this station.

The observations were taken by my assistant at the hospital.

The rain-fall of the past season has been excessive and far above the average.

The climate is variable. Cholera prevails more at the beginning of the hot and cold seasons than at other times. Remittent fevers are most prevalent in the cold season. Dysentery and diarrhœa abound in the rainy and cold seasons.

The proportion of irrigated to unirrigated land is as 2 to 5 and the cultivated to uncultivated as 5 to 2 in the district. This is approximate.

No wells are used in the district. Tanks are numerous.

The produce of the past year is above the average.

The sanitary condition of the station is improving, but that of the district is not attended to.

The Municipal Commissioners are responsible for the sanitary condition of the station.

Tanks have been improved and conservancy matters have been more carefully attended to."

SUGGESTIONS.

" Fill up *kutcha* tanks; square up and keep in good order the tanks for drinking and washing purposes; and above all, plant large trees regularly over the district—trees which, if cared for, will, as they grow up, kill the scrub, and the sanitary condition of the district cannot fail to be improved.

"The climate of the place has, I believe, suffered from the loss of large trees in the cyclones of 1864 and 1867."

" Almost all the tanks receive surface-drainage."

" Persons are allowed to bathe where water for drinking is drawn."

"The station-roads are wide and clean ; the district roads are narrow and puddly."

"In the station there are several latrines belonging to the Railway Company and Municipality. These are supplied with pans which are emptied and carted away daily. They are kept tolerably clean."

"The private privies in the station are plain *pucca* houses with pans which, are cleaned once a week. The dry-earth system has not been adopted."

"I consider that the place is not properly drained. A portion of the station drains towards the fields, the other portion towards the river, and here and there irregularities in the surface of the ground obstruct the flow; again the drains, as a rule, are too deep. Local drainage into tanks by surface drains has been proposed, and will, I believe, be carried out with benefit.

Night soil is thrown into the river.

The bodies of dead animals are promptly removed.

The burning of bodies is permitted on the banks of the river. It is not carefully done. The air around is impregnated with the terrible effluvium resulting from the burning process.

Cremation ought so to be arranged that the smoke should be consumed.

Cattle are slaughtered on the side of the Grand Trunk Road, at a place near to the dwellings of the people. The offal is removed in the conservancy carts.

Cholera is endemic; it also occurs epidemically; small-pox was epidemic in 1865; hepatitis is rare; diarrhœa very prevalent."

VACCINATION.

"The district has hitherto been very partially vaccinated. The station has been better attended to. The district is now vaccinated by men attached to the Metropolitan Circle, the station by a Municipal vaccinator. Inoculation is still practised in the district, but it is dying out of itself. Prejudice against vaccination is rapidly giving way."

3.—HOOGHLY.

The following facts and opinions are reported by Dr. R. F. Thompson, Civil Surgeon of the station.

1. "Hooghly, which is the Sudder Station of the district, is situated in 22° 51′ 59″14 north latitude, 88° 26′ 38″67 east longitude."

3. "On the whole unhealthy for the latter six months of the year."

" There was as usual, little or no sickness during the first half, and not till July did it make its appearance so as to attract attention. It broke out in a severe form at Ghattal, caused by the great inundation in that part of the district, sixty miles from the sudder; and in September sickness broke out at Gobindpore, Nanda, Singhore, Nalicool, Dhunniakhally, Shahabazar and Hurripal."

" The fevers at and around Dhunniakhally, Shahabazar, Gobindpore and Hurripal, assumed as heretofore a severer form than in other places, but of the same intermittent type with great prostration. I have again satisfied myself from the most careful and repeated enquiries and observations, that the disease is not contagious,—a great deal of disease exists from complications of spleen and liver. This fever, in my opinion, which I recorded before, is entirely attributable to local causes and malarious influences. The inhabitants of the villages situated in low swampy ground, are, as a matter of course, more subject to these fevers than those who live on elevated spots."

4. " If a common belief or impression among natives is of any value, the Hooghly district would seem to have undergone a vast change for the worse, in respect of the health of the people."

" The sanitary conditions of Hooghly and Chinsurah, are on the whole good, but in the mofussil sanitary measures are much needed."

5. " No general statistics of sickness and mortality, can be furnished. There has been no registration of deaths. The Municipalities, where established, have commenced to take up this matter."

8. " In this district, fever of a severe intermittent type is of an endemic nature, its attacks are confined mostly to the commencement and breaking up of the rains, and also the beginning of the winter months, and to the periods of the reaping of the rice-crops. The villages that suffer most are those lying along the borders of enormous *bunds* of rice-fields, for which this district is famous,—fields which at certain seasons, are little better than immense shallow marshes, and in which the *ryots* work under conditions the most hostile to health. Cholera shows itself at times in a severe form; frequently it is of a sporadic nature directly traceable to exposure to damp and bad food. The fevers have been most fatal in cases where the patients were very old or very young, and in chronic cases of former years with spleen and liver complications. The Zemindars, I am glad to observe, are being taught to overcome their apathy, and are taking up a more kindly and sympathizing attitude towards the ryots. There are a few cases of leprosy; elephantiasis is common."

" The general health of the prisoners during the past year, has been very good, only twenty-two deaths from all causes out of a daily strength of 59·74. This gratifying reduction in the mortality, I attribute to the improvements that have been carried out in this jail, and chiefly to the introduction of the dry earth system, the constant watching of the diet, preserving the drinking water from contamination, and the instant removal of the sick at any hour, and last, but not least, allotting work according to the physical capabilities of the individual;—formerly upwards of 100 deaths in the year was a common occurrence. The men of the Police have chiefly suffered from bowel complaints,—the climate of Lower Bengal not agreeing with the health and constitution of men from the North-Western Provinces."

„The health of the troops in the Cantonment of Chinsurah, has, on the whole, been satisfactory."

" The people in general do not look healthy; as a rule they are not able-bodied; most of them are poor, ill-fed and unfit for hard work. I do not consider that the place is improving as regards the health of the inhabitants."

" The estimated population of the Hooghly Municipality in May 1868, including Jail and Cantonments, was 27,858.

Men.	Women.	CHILDREN.		TOTAL.
		Male.	Female.	
10,742	11,030	3,478	2,608	27,858

13,70,120 population taken from the Collectorate. The estimated population of the District is, 1,600,000, assuming the number of square miles 1,457 to be correct, the estimate given on authority, the incidence of population to the square mile would be about 1,100."

TOPOGRAPHY.

" The district is watered by the Ganges on the east, while the Damoodah passes through the central parts. This river comes forth or debouches from the Ramghur Hill, flows through Burdwan, enters Hooghly a little below the native town of Selimabad, and then takes a southerly course towards the Ganges, which it enters below Fultah. Several small streams flow from it, carrying at one time fertility and at another time destruction over various parts of the country. During the rainy season, the Damoodah is rapid, deep and wide; but during the hot season it is fordable in many places.

Sometimes the soil is greatly enriched by the inundations, but, as a rule, they are disastrous; both man and beast, and even entire villages are apt to be swept away in a few hours,—the fall is towards the river, favoring natural drainage. Water is found in the dry season between 18 to 20 feet, and in the rainy weather between 7 and 8 feet below the surface. The Tribeny and Nyasari *khalls* are situated respectively from Hooghly civil station at five and seven miles; both *khalls* fall at right angles into the river Hooghly, and drain the country between the Hooghly and Damoodah rivers. Tribeny *khall* after crossing the Railway at Satgong, runs south for a distance of about twenty miles, while the Nyasari *khall* runs directly west as far as the Damoodah embankment to a place called Jamalpore. The banks of both are much lower than the level of the surrounding country, but are, by old inhabitants, said to be silting fast since the Railway was constructed.

The Biddabatty *khall*, a large one, runs directly west from the Hooghly river and drains also the country between the Damoodah and Hooghly, branches of these in heavy floods run into the Tribeny *khall*. The portion between Bansberiah and the Railway is constantly under water during the rainy season. The right bank of the Hooghly river, between Tribeny and Keotah, is higher than the ground west of it, and consequently water lodges west of Bansberiah and Keotah. This might easily be drained into the Hooghly river.

During the rains of 18th and 19th August last, the water west of the above villages, instead of flowing into the Hooghly river, rushed westwards towards the railroad, over-topped the Great Trunk Road two miles north of Hooghly, and washed away one of the culvert bridges.

In the rains, these *khalls* overflow and inundate the surrounding fields, and become the cause of malaria, so that the people, living in this locality, are greatly subject to fevers after the rains.

Irrigation.

I do not myself consider that the natural drainage of the country is interfered with by the Railway embankments. The villages are situated in the centre and along the border of enormous *bunds* of rice-fields,—the face of the country is cut up by streams, dotted with numerous shallow, ponds and covered with an irrepressible vegetation at certain seasons."

METEOROLOGY.

RAINFALL.	1863.	1864.	1865.	1866.	1867.	1868.
January	......	......	......	3·5	·20	......
February	1·4	2·9	2·8	3·6	·50	1·
March	......	......	5·5	......	4·75	3·
April	3·8	·7	2·7	1·4	·30	20·70
May	6·1	8·3	6·1	6·1	3·60	4·20
June	11·4	16·4	11·4	19·4	6·80	15·40
July	18·9	20·5	18·9	20·2	15·40	7·75
August	16·2	7·6	16·2	5·	6·60	40·51
September ...	14·3	7·8	14·3	3·	7·70	20·10
October ...	4·7	5·5	4·7	2·5	5·20	......
November ...	......	......	......	......	2·90	......
December ...	......	......	......	......	......	......
Total ...	76·8	69·7	82·6	64·7	53·95	112·66

The following is a brief memorandum of the analysis of earth taken near the jail:—

Soluble in water	7·00
Consists of Chlorides ...	7·00
Sulphate ...	
Lime ...	
Magnesia ...	
Soluble in Hydrochloric acid	13·40
Consists of Alumina ...	8·20
Peroxide of iron ...	
Carbonate of Lime	3·70
Ditto of Magnesia	1·50
Insoluble in Hydrochloric acid	79·60
Consists of Silica	79·60
TOTAL., ...	100·00

Temperature.	1865.	1866.	1867.	1868.
	Mean.	Mean.	Mean.	Mean.
January	71°	72°	67°	68½°
February	75	73½	75½	75½
March	82	83½	81½	76
April	84	83	88	85
May	83	86	89	84½
June	85	......	86	84½
July	84	89	80	86
August	84	83½	83	84½
September	82½	86½	84	84½
October	82½	82	82	80
November	74½	76½	75	72
December	71½	69	70½	68

CROPS AND HARVEST.

"It may be stated that nine-sixteenths of the district is under cultivation three-sixteenths culturable, but not cultivated, and the remaining one-fourth barren.

Considering the severe inundation that various parts of the district were subjected to during the past year, the crops and harvest have been very good.

Wells are not used.

Tanks are very numerous.

The Chinsurah *Chur* lately formed, is now under cultivation.

The state of drainage at Hooghly is improved, but no regular system of drainage exists in the interior of the district.

The drains are periodically cleaned by the Municipality, and repaired as often as necessary. In times of heavy rains, the surface-drains overflow. The inundation causes destruction of crops and falling of buildings. Many drains run through private premises, and are often found obstructed.

Well privies not used.

Public latrines or *tatties* have been recently introduced, viz., two at Chinsurah and one at Hooghly. They are Municipal latrines and are always kept clean.

A plan of a self-consuming smoke furnace has been submitted for the approval of the Municipality, in which the whole of the night-soil is to be burnt up daily; if successful, it will be a boon to the people every where.

The few wells that do exist are *pucca,* from 20 to 40 feet deep, and periodically cleaned during the dry season.

Contamination. Generally from percolation.

Surface-drainage passes into tanks near all villages; not always surrounded by a bank; drains around them are every where unclean.

Wells are generally protected by railings or a low wall.

The drinking water tank, situated in the centre of the Chinsurah Cantonment, is well protected and guarded, and it is considered to contain wholesome water, which is used by all the European inhabitants.

A Norton's tube well was tried at Hooghly in the College compound but failed. It is to be experimented on again to-day; if successful it would prove a blessing to the inhabitants, for pure drinking water could then be obtained.

For several years past, fevers have made their appearance at the commencement of the rains, continuing unabated till the end of the year. I have earnestly solicited that sanction be obtained for the establishment of temporary dispensaries during the current year, and that they may be placed under my charge so as to meet these sudden outbreaks of sickness, and to keep a nominal Register and correct Mortuary Returns. These dispensaries are recommended to be fixed at Dhunniakhally, Shahabazar, Hurripal and Singhore."

4.—JESSORE.

THE REPORT IS BY DOCTOR KENNETH McLEOD.

Jessore, Latitude 23° 9′ North, Longitude 89° 7′ 1″ East.

"I consider both station and district decidedly unhealthy.

I have no reason to suppose that either district or station are more or less healthy, or rather unhealthy, in later than earlier years. The only indications of any change in the sanitary condition of Jessore is the belief that cholera has prevailed more largely in the district subsequently to 1867, than previous to that year. Whether the disease was, as it undoubtedly is now an annual product, or at any rate a phenomenon of yearly occurrence to a greater or less extent, it is certain that in that year a most virulent visitation of cholera occurred, and that ever since then the district has been the seat of violent outbreaks of the disease. Jessore also participated, along with other districts adjoining, in the outbreaks of so-called epidemic fever which prevailed from 1860 to 1865. Indeed, this peculiar manifestation of disease appears to have had its rise in the district (*vide* Dr. Elliott's Report). I find, in an old Annual Report copy book, the following account by Dr. W. H. B. Ross, the Civil Assistant Surgeon of Jessore, of an outbreak of fever in 1846, which reminds me strongly of the accounts received of the so-called epidemic of 1865 when I first joined the station." He writes: "November 1846. The Jessore station and jail in common with the whole of the neighbouring district was exceedingly unhealthy during the last week of the month of October, and during the whole month of November. According to the accounts I have received from Europeans and intelligent natives, the amount of sickness and fever was perfectly appalling, and disease was not only virulent as regards the number who were attacked, but the mortality was *most excessive.* In the city of Jessore which contains a population of about 6,000 people, about 10 *deaths occurred, it was computed daily;* nearly three-fourths of the domestic servants and about the same number of the law officers connected with the law courts were laid up. The European officers suffered nearly to the same extent; out of thirty-three European or Eurasian inhabitants, twenty-two were all under medical treatment during the month. The epidemic from which they all suffered, was a very peculiar description of fever which in general commenced as a common quotidian intermittent, but which after the few first days, from the 1st to 5th, assumed a continued type, the remissions or intermissions being scarcely perceptible and the cold stage being merely a species of transient horripilation and shivering, which only lasted a few minutes, which was followed by great heat of skin. This was only occasionally followed by a cold clammy perspiration."

" The *complications* which were observed were principally of the head and chest and as frequently of the latter as the former. There can be no doubt that the great amount of sickness was *solely to be ascribed to the lateness of the rains and the sudden drying up of the river Bhyrub.*" Dr. Ross considered this out-break sufficiently serious to demand a special report to the Superintending Surgeon, in which he remarks that owing to the cessation of rain early in November, the water of the Bhyrub river fell suddenly and exposed a large quantity of decaying putrid vegetation to the rays of the sun. He speaks of this having formerly been a fine large river, but now much damaged by a *bund* thrown across it by the proprietor of some Indigo concern. He describes the great prevalence of endemic fevers which occur annually, and says, "but although there is much unhealthiness in this district during most years, there are particular years like the present which show a greater extent of sickness from febrile affections." "Fevers of the continued type have been most common (this year) whereas, in usual seasons intermittent and remittent fevers are most common." He further talks of the mortality as *fearful.*

I have adduced these extracts because I am certain that if a similar outbreak were to occur now, the disease would be called "*epidemic* fever" and to show that as far back as 1846, exceptional outbreaks of malarious fever, in which the intermittent type was almost or completely merged in the continued, have occurred. I can find no precise mention of any other in Jessore up to 1865, when epidemic fever proved most fatal to the inhabitants of the whole district. The inhabitants of this district have come to consider an outbreak of fever in the months of September, October and November, as a condition of their existence, and though few inhabitants of a village are free from it, and many succumb to its effects immediately or remotely, it is considered as the usual and normal occurrence, and it is only exceptional outbreaks, such as that of 1846 and 1865, which arrest attention and arouse alarm. In travelling through the district, on the breaking up of the rains, and enquiring into the health of a village, I have frequently been told that they are only suffering from fever, while particular inquiry would disclose the fact that the majority of the inhabitants were laid up, and many deaths were occurring, while the children presented enlarged spleen, anæmia, anasarca, &c., &c., with few exceptions.

In furnishing a report of the thirteen charitable dispensaries of this district for 1867, I found that of 18,769 admissions of out-door patients; 9,380 or about 49 per cent belonged to the miasmatic order of diseases; 1,049 or about 5 per cent to the enthetic; 4 to the dietic, &c.; 642 to the parasitic. Thus about 57 per cent of the whole come under the zymotic class. Of constitutional diseases, 157 cases were diathetic and 57 phthisical, or rather more than 1 per cent belonged to this class.

In all about 35 per cent belonged to the local class; of the remainder; 35 cases were developmental diseases, and 449 violent.

As regards individual diseases the following were the most common, in the order of greatest number admitted:—

1 Febris intermittens (6,033); 2 Rheumatismus (1,064); 3 Splenitis (Malarious enlargement of spleen) (1,048); 4 Dyspepsia (988); 5 Obstipatio (901); 6 Ulcer (881); 7 Diarrhœa (577); 8 Otitis (549); 9 Scabies (526); 10 Phlegmon and Abscess (511); 11 Dysenteria (485); 12 Syphilis Secondaria (392) 13 Cholera (323): 14 Ophthalmia (322): 15 Bronchitis (308); 16 Gonorrhœa (226); 17 Herpes (206); 18 Syphilis Primarea (186); 19 Febris Continua (179); [This is probably remittent Fever]; 20 Bubo (167.) The foregoing will give a very fair estimate of the comparative frequency of the specific diseases noted. I shall hereafter give the statistics of the Jessore jail for twenty-two years, in a somewhat similar form; the death rate of different forms of disease among the general population cannot be given even approximately.

Leprosy and elephantiasis are comparatively rare; cases are, however, seen occasionally.

Cholera has been extensively prevalent in this district during the latter months of 1867 and the ealier months of 1868.

It prevailed very generally all over the district, breaking out here and there without any apparent rule. Several thousand deaths occurred from this cause throughout the district. The disease appeared soon after the cyclone, and while the waters of an unusually high inundation were rapidly subsiding. I observed that the localities situated on the banks of the larger rivers of the district were those first attacked; then the drainage of the water would be more rapid, and the sinking of the subsoil water more immediate, The months of November, December, January and February were characterized by an almost complete absence of rain. In March and April, however, rain fell in frequent copious showers, and cholera abated and subsided in the course of these months. I cannot but attribute the development of the very general outbreak of the disease to—1st, the very general soaking with water which the whole district sustained; 2nd, to the rapid subsidence of the water; and 3rd, to the absence of rain. What further more minute change in soil and vegetation these general conditions gave rise to, I find it impossible to say. The type of this cholera was not very severe, as the station was not visited with any degree of severity and the jail not at all.

Beyond this outbreak of cholera no extraordinary sickness has occurred within the last two years.

The fever of last October was moderate.

Disease is decidedly more general and fatal in the months of March, April and May, and September, October and November, than in the months intervening between these. The excess in the earlier months is owing to cholera and bowel complaints, and in the latter ones to fevers. The cold weather months are less healthy than the rains, which are decidedly the healthiest months of the year as regards all kinds of diseases. Inflammatory chest diseases and rheumatic affections are most common in the cold months. Eruptive fevers attain a maximum in the hot weather, splenic and other *sequelæ* of malarious fevers are particularly baneful in the cold months. Cholera also frequently breaks out in October and November, and dysentery is often very bad in September.

I believe that in adjoining districts the same statements are true. The following table exhibits the sanitary statistics of the Jessore jail for twenty-three continuous years from 1845 to 1867.

Years.		Average Strength.	Number of admissions in to Hospital.	Number of deaths.	Average daily sick.	Admission per cent. of strength.	Deaths per cent. of strength.	Deaths per cent. of admissions.	Constant sick per cent. of strength.
1845	...	683·166	393	18	28·211	57·554	2·635	4·580	4·130
1846	...	782·833	645	33	27·297	82·375	4·214	5·116	3·486
1847	...	852·833	861	30	27·119	100·937	3·517	3·484	3·178
1848	...	1004·833	1,455	45	33·754	144·775	4·477	3·092	3·363
1849	...	962·333	1,480	61	35·418	153·846	6·341	4·121	3·681
1850	...	791·083	1,180	45	27·931	149·178	5·689	3·813	3·531
1851	..	693·666	1,605	33	48·785	231·267	4·755	2·056	7·028
1852	...	764·129	1,808	44	47·903	236·649	5·759	2·433	6·270
1853	...	676·674	1,724	66	47·108	254·652	9·748	3·828	6·958
1854	...	598·116	1,625	34	48·772	271·739	5·685	2·092	8·155
1855	...	568·859	1,006	40	24·091	276·801	7·029	3·976	4·233
1856	...	552·371	1,379	14	33·545	249·818	2·536	1·015	6·076
1857	...	550·400	905	16	21·434	164·545	2·909	1·767	3·897
1858	...	509·864	683	26	15·417	133·921	5·908	3·807	3·022
1859	...	453·917	471	3	9·224	103·744	·660	1·636	2·031
1860	...	445·213	641	9	14·847	144·044	2·022	1·404	3·336
1861	...	540·062	754	25	26·750	139·629	4·629	3·515	4·953
1862	...	620·644	605	13	17·122	97·580	2·093	2·149	2·757
1863	...	610·530	733	17	29·153	152·700	2·782	1·822	4·771
1864	...	489·708	750	36	23·459	153·061	7·346	4·800	4·787
1865	...	525·318	760	21	22·450	144·761	4·	2·763	4·276
1866	...	532·647	596	20	22·490	111·894	3·754	3·355	4·222
1867	...	597·628	836	33	28·211	139·866	5·521	3·947	4·724

The average of the twenty-two years (1845-66) shows that among a population of 6,41,710—1011·7 admissions, and 29·5 deaths took place yearly; that 27·9 were daily on the sick register; 157·6 per cent. of average strength were admitted; that the deaths amounted to 45 per 1,000 of strength; and 29 per 1,000 of admissions; and that 43 per 1,000 of the population were constantly sick.

The population of Jessore is about 1,257,154. The proportion of men, women, male and female children cannot be ascertained.

The number above given is a mere approximation, derived from returns of villages and houses furnished by the Police.

There is no proper registration; the Police are ordered to register deaths, but their returns are not reliable.

I think that nothing short of a periodical accurate census, and a systematic registration of births and deaths by a special agency, would supply *data* sufficiently accurate for sanitary purposes.

The following table will exhibit the amount of sickness and mortality during the twelve months in question for each month of the year :—

MONTHS.	ADMISSIONS.		DEATHS.		Daily average sick.	PER CENT OF STRENGTH.		
	Aggregate.	Average.	Aggregate.	Average.		Admissions.	Deaths.	Daily average sick.
January	1,802	81·9	59	2·6	29·016	13·0	·4	4·3
February	1,704	77·4	42	1·9	31·105	11·8	·3	4·7
March	2,280	103·6	74	3·3	30·789	15·9	·5	4·7
April	2,285	103·8	81	3·6	32·097	16·0	·5	4·9
May	1,701	77·3	58	2·6	28·090	12·0	·4	4·3
June	1,644	74·7	42	1·9	24·467	11·4	·3	3·7
July	1,666	75·7	35	1·5	25·300	11·5	·2	3·8
August	1,772	80·5	35	1·5	25·174	12·3	·2	3·8
September	1,768	80·3	38	1·7	26·064	12·2	·3	3·9
October	1,973	89·6	50	2·2	28·677	13·7	·3	4·3
November	1,933	87·8	65	2·9	30·372	13·8	·4	4·7
December	1,731	78·6	70	3·1	26·607	12·4	·5	4·2

This table illustrates the statements already made as to the comparative healthiness of different seasons of the year, and coincides with impressions gained from general experience.

I have only statistics of the Police force for two years. In 1866, with an average strength of 664, there were 14 deaths (21 per 1000); and in 1867, with 741 average strength, 22 deaths (*i. e.*, 29 per 1000.)

The average number in hospital for these years was 11·2 and 12·5. This does not include cases of illness which occurred at out-posts, nor cases for which sick leave was granted. A systematic return of the health of the Police would ultimately give valuable results.

The following table gives the relative prevalence and fatality of different groups of diseases. It is deduced from the records of the jail for twenty-two years.

Classes, orders and groups of diseases.	Admissions per cent. of		Serial No.	Deaths per cent of			Serial No.
	Strength.	Total admissions.		Strength.	Total deaths.	Cases treated.	
Classes of Disease.							
Zymotic	115·9	73·5	1	2·9	63·7	2·5	1
Local	36·0	24·0	2	1·0	22·4	2·7	2
Constitutional	1·7	1·1	3	·51	11·4	28·3	3
Violent diseases and deaths	1·6	1·0	4	·02	·7	1·2	4
Developmental	·77	·4	5	·08	1·8	10·8	5
Orders of Disease.							
Miasmatic	111·0	71·5	1	2·8	63·1	2·5	1
Chrotici (skin diseases)	17·6	11·1	2	·12	2·6	·68	7
Enterici	13·4	8·5	3	·18	4·3	1·4	5
Pneumonici	3·9	2·4	4	·57	12·6	14·6	2
Enthetici	2·5	1·6	5	·02	·4	·8	9
Cephalici	1·3	·85	6	·13	3-2	10·9	6
Diathetici	1·1	·73	7	·24	5·5	22·0	4
Phthisici	·68	·43	8	·26	5·8	22·0	3
Parasitici	·60	·39	9	......	......	......	...
Myostici	·32	·20	10	·006	·15	2·1	12
Gennnetici	·21	·13	11	......	......	......	...
Nephritici	·13	·09	12	·006	·15	4·7	11
Cardiaci	·10	·06	13	·04	·92	4·0	8
Dieticio	·08	·06	14	·006	·15	7·6	10

Classes, orders and groups of diseases.	Admissions per cent of		Serial No.	Deaths per cent of			Serial No.
	Strength.	Total admissions.		Strength.	Total deaths.	Cases treated.	

Natural Groups of Disease.

Classes, orders and groups of diseases.	Strength.	Total admissions.	Serial No.	Strength.	Total deaths.	Cases treated.	Serial No.
.Fevers	72·8	46·2	1	·56	12·4	·78	· 2
Miasmatic bowel complaints	21·5	13·1	2	2·2	47·9	10·2	1
Abscesses and ulcers	14·7	9·4	3	·04	·92	·28	13
Functional stomach diseases	10·6	6·7	4	·02	·61	·27	17
Eruptive Fevers	6·1	3·9	5	·07	1·7	1·2	8
Catarrhal affections	4·0	2·7	6	·04	·92	·15	14
Rheumatic affections	3·8	2·4	7	·006	·15	·21	22
Ophthalmia (Miasmatic)	3·5	2·2	8	......	......	......	...
Inflammatory lung diseases	3·2	2·0	9	·52	12·6	16·2	3
Skin diseases	2·6	1·6	10	·006	·15	·68	28
Venereal diseases	2·0	1·3	11	......	......	......	...
Spleen diseases	1·6	1·0	12	·07	1·7	4·5	9
Wounds and injuries	1·6	1·0	13	·02	·46	1·2	19
Diathetic diseases	1·1	·73	14	·24	5·5	22·0	5
Developmental diseases, Dropsy, &c. ...	·77	·49	15	·08	1·8	00·8	7
Non-Inflammatory stomach diseases ...	·76	·48	16	·01	·30	1·8	20
Phithisical diseases	·68	·43	17	·26	5·8	38·7	4
Functional lung diseases	·68	·43	18	·04	1·0	7·2	10
Parasitic diseases	·60	·39	19	......	......	......	...
Erysipelatous diseases	·49	·29	20	·006	·15	2·	21
Non-Venereal enthetic diseases	·40	·24	21	·02	·61	5·	18
Ear diseases	·38	·24	22	......	......	......	...
Apoplexy and Paralysis	·32	·20	23	·09	2·1	19·1	6
Diseases of bones and muscles	·32	·20	24	·006	·15	2·1	27
Eye diseases	·28	·17	25	......	......	......	...
Liver diseases	·24	·15	26	·04	·92	16·2	12
Diseases of the generative organs ...	·21	·13	27	......	......	......	...
Spasmodic diseases	·15	·09	28	·04	·92	60·	11
Tumours	·15	·09	29	......	......	......	...
Functional Head diseases	·13	·09	30	......	......	......	...
Diseases of the urinary passages ...	·10	·06	31	......	......	......	...
Dietic diseases	10	·06	32	·006	·15	7·6	23
Heart diseases	·10	·06	33	·04	·92	4·0	15
Inflammatory stomach diseases	·07	·04	34	·03	·77	45·4	16
Kidney diseases	·02	·02	35	·006	·15	16·6	26
Inflammatary head diseases	·02	·01	36	·006	·15	25·	24
Diseases of vessels	·01	·008	37	·006	·15	50·	25

The incidence of population to the square *mile* is 376, taking the area of the district to be 3651·418 square *miles*.

TOPOGRAPHY, &c.

The district of Jessore is a portion of the delta of the river Ganges. It is a long narrow plain extending from the sea about 120 miles northward. Its breadth is about fifty miles. It is bounded on the north by Pubnah; on the south by the Sunderbuns and the Bay of Bengal; on the east by Furreedpore and Backergunge; and on the west by Nuddea.

It is intersected by rivers, running southwards and communicating by numerous *khalls*. The principal rivers are the Koomar and Mudhoomutty, bounding the district to the east and north. The Kobaduck, bounding it on the west, and the Bhyrub, Chitrah and Nobogunga traversing the district. The banks of these rivers are generally higher and more wooded than the meshes of land between them; large *bheels,* partially dried up in the dry months, cover a great portion of the surface of the country. The physical characters of the country vary with the time of year. The proportion of dry and water-covered land is very different in the rainy and dry months. *To ascertain this accurately in different months and years is still a desideratum. It would be of great sanitary importance to have gauges placed on rivers, bheels, and tanks throughout the district, and to have these periodically observed. The exact physical conditions of it might then be told with greater accuracy, and such returns would compare instructively with that of rain-fall, health, &c. One such gauge I have had placed on the Bhyrub river as it passes the station, and its indications are noted* daily. The district is nearly a dead level, but there is some "fall" southwards; what it is precisely I am not aware. The north and north-eastern part of the district is a little higher than the south and south-western.

On an average at what depth from the surface is the sub-soil water found?

This varies with the time of year, but generally water can always be found within a few feet of the surface.

The Bhyrub river runs past the station, to the east of it. The banks of rivers are generally higher than the level of the surrounding country.

The station is about ten feet above the level of the Bhyrub, from ten to twenty according to the height of the latter.

The Bhyrub is said once to have been a fine large river, but to have become silted up very considerably. This is strongly stated in some annual reports of former Civil Surgeons, and the condition of the river is said to be an important cause of disease. The opinion of Dr. Ross on this subject has been already cited. The following extracts are from reports by Dr. C. Palmer, and they are interesting as bearing upon the health of the station. "The state in which the river is kept is one which I cannot pass over without notice. The banks have been drained in the immediate vicinity of the station and jail, and wherever there is any accumulation of mud, the river is itself cleaned. The consequence is that from the further end of the station to the jail the river is always quite clean, and the banks for the most part clean and tolerably dry. My predecessor, Dr. Ross, repeatedly pointed to this (silting) as a great source of disease, and I believe that it was principally through his exertions that we owe the present improvement in this quarter. Beyond this, above the station, and below the jail, the river is a filthy floating morass on the edges, and choked with weeds and mud. It would indeed be an invaluable boon were we able to open the river above, so as to have a body of water deserving the name of a river. This point has been twice brought before the notice of Government. It is reported that owing to part of the present bed of the Bhyrub (the Jessore river) being higher than that of the river which it leaves (the Kobaduck) it is impossible to re-open it, but I imagine the question is not yet decided, and we have still hopes of one day seeing the old river restored which some years ago was a good stream."—(*Annual Report for* 1848.)

Doctor Palmer again writes :—

" In addition to the remarks already made on the subject I have now to record that an attempt was made during the rains to carry out certain suggestions of Government for the purpose of improving the river, and an embankment was thrown across it below the jail. A very considerable quantity of water accumulated, and the old bed of the river was silted; but it now became apparent that by thus damming up the river, the drainage of the whole station was entirely checked, all the drains that had been previously cut remained full, and the station and neighbourhood were consequently rendered unusually damp and insalubrious. Add to this also that it was evident that this sheet of water would soon be filled with weeds, which were rapidly sprouting up, and that during the ensuing hot weather, it was doubtful whether by evaporation alone the banks would not be left in a state of quagmire. All these circumstances combined pretty clearly showed that the damming up of the river with a view to forming an artificial lake was a decided failure in a sanitary point of view. In October a small cut was ordered to be made to draw off a small quantity of water with a view, as I understand, of diminishing the height of the accumulated water, and thus permit the filled-up drains of the station to discharge their contents into the lake. The impossibility of this measure did not strike the magistrate and the natural result of cutting a small channel through the top of a mud embankment in a few minutes showed itself; the water cut a complete channel for itself, and the stagnant Bhyrub was for a few hours converted into a furious torrent; but it quickly fell to its usual state of inactivity."—*Annual Report for* 1853.)

Doctor Palmer goes on to describe how the decaying vegetation left by the receding water, and acted on by the mud, caused a horrible stench, and suggests deepening and narrowing the bed of the river as the only method remaining of rendering it less pestilential.

The different expedients adopted to improve the condition of this river have been, as far as I can discover :

1st. An endeavour to divert the waters of the Kobaduck river, from which it rises, into the Bhyrub, by placing a *bund* on the former below where the latter takes its rise from it. This was attempted and a very substantial *bund* constructed. The plan, however, failed. The waters of the Kobaduck finding their way past the *bund* into the old channel it has not been tried a second time ; although Captain Forbes, the present Executive Engineer, thinks the plan a good one, and surmises that, with greater care in carrying it out, it might greatly improve the Bhyrub.

2nd. Damming up the river below the station so as to form an artificial lake. The result of this experiment, is detailed above and it has not been again tried. The remains of this and the other *bund* are still visible.

3rd. Narrowing the river, and deepening its bed ; this has been done to some extent, and has undoubtedly improved the river as it passes through the station.

4th. Digging tanks on the broad sloping margin ; this has been done opposite the jail, and is a good plan of abolishing swampy banks and narrowing the river.

5th. Introducing the tide by cutting a more direct course to the nearest tidal river (about twelve miles out of the station). The Bhyrub when it leaves the station winds about in a most extraordinary manner, and the Engineers, who have reported on the subject, have pronounced the scheme a good one, but it has not been carried out for want of funds.

The present condition of the river corresponds very closely with former descriptions. As it passes through the station it is tolerably clean, but above and below the station its banks are swampy, and its waters sluggish and covered with weeds. It is a little better during the rains, but as the water subsides it becomes little better than a *nullah* or elongated *bheel* of the very worst description. The surface of the district is very extensively submerged during the months of July, August and September. The degree varies. In 1867, the inundation was most severe, so much so that it was possible to traverse the district in a *dinghy* from any one point to another. The roads were broken up and many villages and bazaars flooded. In 1861 also a still higher flood occurred. This year the inundation has been comparatively slight. The station is situated on a platform on the eastern and southern banks of the river Bhyrub already described.

The station itself is pretty well raised and never absolutely under water. It is surrounded, however, by paddy fields, in which the water lodges to a very great extent, from May to October. To the east of the station, there is a large *maidan* of this description, an expanse of flat ground in which rice is cultivated. In this water always lodges to the depth of one or two feet during the rains.

To the south and south-east also, large expanses of a similar description occur. To the north and north-east and north-west there are similar fields, but smaller. The station is in fact embedded in paddy fields which come within a few yards of some of the houses. Beyond the river, the land is somewhat higher, but only for a short distance and paddy fields and swamps again occur. The station itself is clear of jungle, but some of the villages, notably Purana Kusba to the north-west and Bogcha to the south, are very densely wooded. Indeed as a rule, native villages in this district are excessively jungly. Between the houses, underwood of every description forms an impenetrable tangled mass of vegetation, intersected by narrow paths; of this description are many of the villages near the station. The bazaar, thanks to the efforts of former magistrates, is more open. There are many tanks in and around the station; some good, clean, and well kept, some covered with weeds, partially or entirely, and some converted entirely into a marsh and not used now.

From previous answers it will appear that Jessore is surrounded on every aspect by swampy bund and stagnant water. The conditions described could hardly be rectified without operations of a magnitude sufficient to alter the whole face of the country. Old tanks, however, should be filled up or dug anew, and tanks in use kept clean; swamps should be artificially drained and stagnant *nullahs* narrowed and deepened, or abolished. On the whole I consider engineering practically powerless to alter radically the physical peculiarities of this delta, and without such a radical alteration the conditions of disease-production (alternate soaking and drying of land, rising and sinking of subsoil water, immersion and exposure, flow and stagnation, rain and the want of it, &c., &c.), must go on unabated. In the face of the natural conditions, physical and meteorological, of such a district as this, sanitary effort must limit itself to removing palpable insanitary conditions more immediately connected with human residence, employment, diet conservancy, &c., until advancing science places its finger on the exact conditions whence all the disease so rife at particular seasons proceeds, and even then it is questionable whether human effort can prevail when the antagonist is a disease-laboratory reckoning its area by square miles of surface.

METEOROLOGY, CLIMATE, &c.

The thermometrical and rain-fall statistics of twelve years are given in the following table :—

Range of temperature.		Month.	Mean average temperature of eleven preceding years 1856-66.	Mean temperature of 1867.	Average rain-fall of 8 preceding years 1856-63.	Rain-fall of 1867.
17·8	36·5	January ...	66·02	64·3	·19	·250
24·5	38·1	February ...	71·44	67·8	·06	1·100
20·3	44·1	March ...	80·36	77·7	1·6	2·420
19·8	48·8	April	83·45	80·2	4·3	9·821
16·4	33·1	May	83·83	82·7	11·8	4·449
12·2	25·3	June	83·96	82·2	13·0	8·308
10·1	19·9	July	83·63	81·8	13·6	12·502
7·1	19·6	August ...	83·23	83·2	12·1	14·193
7·5	18·4	September ...	83·53	84·0	8·9	13·349
14·3	......	October ...	80·51	80·5	7·5	10·089
16·6	......	November ...	74·31	72·1	·61	4·651
17·6	......	December ...	66·85	64·6	·35	......
		Total ...	......	......	74·01	81·142
Average of 11 years.	1868.	Average ...	78·45	76·7		

These results are not perfectly accurate, but are probably close approximations. The temperature readings are too high, because until last year the instruments were kept in a *pucca* house; last year a shed was constructed specially for them.

The temperature and rain-fall up to date for 1869 have been recorded as follows :—

Months.	January.	February.	March.	April.	May.	June.	July.	August.	September.	Total.
Temperature	64·4	68·6	77·9	80·4	82·4	83·1	83·7	83·4	82·5	
Rain-fall in inches... ...	·019	1·563	1·022	10·270	9·845	16·640	12·242	20·531	9·457	81·598

Barometrical readings have only been recorded since the beginning of 1867. The barometer is "Adie's Marine Barometer" and the readings have been corrected and reduced to 32° Fah. The results for 1867 and nine months of 1868 are as follow:—

MONTHS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1867.												
Maximum ...	30·210	30·122	30·085	29·987	29·829	29·733	29·771	29·694	29·846	30·066	30·258	30·184
Minimum ...	29·938	29·792	29·722	29·600	29·358	29·327	29·377	29·470	29·391	29·722	29·126	29·918
Medium ...	30·062	30·005	29·900	29·810	29·640	29·578	29·549	29·596	29·635	29·869	30·016	30·057
1868.												
Maximum ...	30·166	30·124	29·995	29·969	29·976	29·864	29·696	29·872	29·874	...	...	...
Minimum ...	29·858	29·660	29·737	29·555	29·505	29·286	29·383	29·350	29·50	...	...	...
Medium ...	30·018	29.937	29·864	29·765	29·747	29·534	29·577	29·569	29·680	...	...	...

The hygrometrical readings for 1867 are as follow:—

MONTHS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Mean.
Depression of wet bulb ...	4·2	5·5	5·6	5·1	11·9	2·4	2·3	2·6	3·5	3·9	3·6	4·4	3·9
Elastic force of vapor at temperature of dew point.	·462	·484	·679	·799	·956	·990	·975	·984	·968	·820	·635	·474	·791
Humidity Sat. =1,000 ...	·766	·721	·708	·760	·833	·875	·880	·868	·828	·809	·813	·792	·803

The results for this year have not as yet been summarised, and time will not permit of my attempting the task.

The following statement derived from the experience of 1867 will give a general idea of the meteorological peculiarities of Jessore. In future years it will be modified or confirmed :—

Months.	Atmospheric pressure.	Range of Barometer.	Humidity.	Mean temperature.	Range of temperature.	Wind.	Rain.	Storms, &c.
January	Maximum of whole year.	Limited below mean.	Below average of year.	Minimum of year	Considerable	N. W.	Slight fall	None
February	Decreasing above average.	Increasing below average.	Decreasing	Increasing below average.	Maximum of year	N. W. & S. W.	A little more than January.	None
March	Ditto	Increasing below average.	Minimum	Increasing above average.	Decreasing	S. W—S. E. & S. S. W. & E.	More than February.	Several north-westers with thunder and lightning.
April	Ditto	Ditto	Increasing below average.	Increasing	Ditto	S. W—S. E—N. W. N. E b E. force moderate.	Considerable fall	Ditto
May	Decreasing below average.	Maximum of year.	Increasing above average.	Ditto	Ditto	S. W—S. E—W-W. S. W-N. E. force great.	Less than April	Ditto
June	Ditto	Decreasing above average.	Increasing	Less than May	Ditto	S. E—S. S. W—E. force considerable.	Considerable fall	Ditto
July	Minimum of year.	Ditto	Maximum of year	Less than June	Ditto	S. E—S. W. force considerable.	Great fall	None
August	Increasing below average.	Minimum of year.	Decreasing above average.	Higher than July	Minimum	S. E. force considerable.	Maximum fall	None
September.	Ditto	Above average	Decreasing above average.	Maximum of year	Increasing	S. E—S. S. W—E. force moderate.	Less than August	None
October	Increasing above average.	About average	Decreasing above average.	Considerable decrease.	Great increase	E b N—S. S. E. great force N. & W. force small.	Less than September.	None
November	Ditto	Exceptionally great.	Out of series above average.	Below average	A little greater than October.	N. E—N. W—S. S. E.—N. & E.	Moderate fall	Severe cyclone
December	Ditto	Limited; below average.	Below average	Considerably below average.	A little greater than November	N. E—N. W—W—S. E. force small.	None	None

The observations were taken at the jail hospital by the Civil Assistant Surgeon and his assistants.

There has been a decided excess of rain as compared with former years.

January and February are cold bracing months; very little, sometimes no rain falls during these months. Sometimes it is cold enough for a coal firs. There is a steady north-west wind. Considerable dew falls in the evening and only dries up with the morning sun. This is especially noticeable in a boat. Persons predisposed to fever and rheumatism frequently suffer in these months.

Sequelæ of fevers of the preceding year are apt to prove troublesome, and inflammatory affections of the lungs are common.

March is a variable month; cool if the wind is from the north, and warm if from the south. The sun is much more powerful, heavy dew and morning fogs are common; cholera and diarrhœa are apt to appear in this month especially if a dry one.

April and May are very hot months. A strong south-westerly breeze blows, and frequent nor-westers accompanied with lightning, thunder and more or less rain occur. Cholera and diarrhœa are apt to rage during these months. Sometimes in their course the "chota bursat" falls. If this is absent, the cultivation of the crops is greatly interfered with, the ground being hard and not amenable to the rude ploughs used by the ryots. During this month also good heavy showers are looked for with great anxiety, by indigo planters. If these months are very dry, cholera is apt to acquire great strength; but if a heavy and sustained fall of rain occur, the disease generally abates or disappears. One storm may temporarily check an outbreak, but if not followed up by others it is apt to re-appear.

The first fifteen days of June are generally excessively hot. On or about the 15th, clouds begin to roll up from the south and the rains set in. I have observed that intermittents and remittents are prevalent on the setting in of the rains. The commencement of the rains is generally accompanied with electrical disturbances; July and October are the rainy months *par excellence*. They are, however, very pleasant and healthy months.

September is a very hot month. Showers of rain become less frequent, and the periods intervening between them are times of very trying heat; not that the temperature is greater than in April and May, but the sensation of heat is certainly more intense. The weather is described as "muggy or steamy." Fevers, intermittent and remittent, begin to prevail in this month.

October, up to the 15th is September continued, after then the advent of cold weather is presaged by a cool night-breeze, and diminished heat of the sun. Fevers of all sorts are very prevalent in this month, and if no rain falls at intervals and the inundation subsides rapidly, they become very virulent and fatal.

November and December are cold weather months. Fevers gradually subside and the cases which occur in these months are mostly sequelæ of the September and October outbursts. Cholera frequently breaks out in October and November and sometimes prevails sporadically all through the cold weather. If the rains have been late of stopping, and the subsidence of the inundation delayed, the outbreak of fevers is postponed, as was the case in 1867.

There is no artificially irrigated land. It is reckoned that 1,763,753 acres are cultivated, and 5,68,630 uncultivated; this is a mere approximation.

This year early rain interfered with the transplanting of the *aman* rice, and on that account the usual amount was not cultivated, excess of rain also caused, in July, the development of a small beetle.—" thenkoo poka " (the *hispa*) which destroyed the crop to a great extent. With these drawbacks the crop promises well. Rice is selling at twenty-one seers for the rupee, which is about the average price.

Except the beetle already alluded to, I know of no other source of deterioration of crop in the form of blight. River water is the best; during the rains, however, it contains a large amount of suspended matters. Towards the south of the district also it is brackish. Tank water varies with the character of the tank. As a general rule I should say it was bad, containing animal and vegetable organisms. *Bheel* water is very bad, and well water still worse. No care is taken to keep wells clean; all these matters might be remedied.

Wells are generally made of a series of earthen-ware cylinders, fitted into each other. They are from 20 to 30 feet deep.

The depth of tanks averages about 15 feet.

Jessore is well drained. The principal drains are *pucca* and they have a good slope.

How is the drainage water, &c.? Into the Bhyrub.

What is the depth, &c.? From 1 to 6 feet.

Are they kept clean? Yes.

How often are they, &c.? As often as is necessary, under the orders of the municipal authorities.

Are they ever, &c.? No.

Are cesspits, &c.? Only in the private compounds of natives.

Do public latrines, &c.? They are in course of erection; they are to work on the dry earth system of conservancy.

CREMATION AND INTERMENT OF THE DEAD.

The bodies of Hindoos are burnt near Nilgunge, a village about one mile to the south of the station.

Is it done, &c.? Generally, except in the case of low castes and prostitutes whose bodies are often merely thrown into the stream.

At what depth, &c.? About four feet.

The Mussulman burying grounds are generally near villages.

The corpses are sometimes thrown into *bheels* and on *maidans*, and devoured by jackals, vultures, &c.

SLAUGHTER OF ANIMALS AND DISPOSAL OF THEIR CARCASES.

There is no slaughter house in Jessore; when animals die, their carcases are thrown on a *maidan* and left to jackals, dogs, vultures and adjutants.

UNWHOLESOME LIQUORS.

The inhabitants are, as a rule, very abstemious as regards intoxicating liquor, the consumption of which is limited to some of the advanced natives.

SPECIFIC DISEASES.

Intermittent Fever. Fevers of an intermittent type prevail in Jessore throughout the year, but they are much more common during the months of September and October than at any other time of the year.

The result of twenty-two years experience in the Jessore jail is follows:—

Annual admissions *per cent.* of strength	30·8
Deaths *per cent.* of strength, *per annum*	·006
Deaths *per cent.* of admissions	·02
Admissions *per cent.* of total admissions	19·6
Deaths ditto deaths	10·4

Admissions per cent of strength for each month.

January.	*February.*	*March.*	*April.*	*May.*	*June.*	*July.*	*August.*	*September.*	*Octr.*	*Novr.*	*Dec.*
2·0	1·9	2·9	2·0	1·8	2·4	2·7	3·1	2·5	3·5	3·6	2·2

There is no peculiarity in the intermittent fevers of Jessore distinguishing them from those of other places except their severity and proneness to be followed by severe sequelœ.

2. *Remittent Fever.*—Remittent fevers are very common in Jessore at the setting in and close of the rains. The statistics of twenty-two years in the jail are as follow:—

Admissions *per cent.* of strength	27·6
Deaths *per cent.* of strength	·35
Deaths *per cent.* of admissions	1·29
Admissions *per cent.* of total admissions	17·5
Deaths *per cent.* of total deaths	8·0

Admissions *per cent.* of strength for

January.	*February.*	*March.*	*April.*	*May.*	*June.*	*July.*	*August.*	*September.*	*Octr.*	*Novr.*	*Dec.*
2·4	2·4	2·3	1·8	1·3	1·8	1·7	2·0	2·7	3·4	3·1	2·1

Remittents are very apt to be accompanied by cerebral complications and a fatal issue by coma is not at all uncommon. Pulmonary complications also occur frequently, in the form principally of pneumonia, which, if the spleen is at the same time enlarged, is generally fatal. Bronchitis, with great dyspnœa and a copious bronchorrhœa, is also very common. I have found a smart emetic the best method of relieving this condition. It is curious to observe that in the years 1849-52, when the population of the jail was very dense, remittent fever took the place of intermittent.

3. Continued fevers have been observed in very unhealthy year, the remittent type apparently merging into the continued. I have seen some well marked fevers of a typhoid type in Jessore but not to an epidemic degree.

4. *Cholera.*—Is an annual visitant of the Jessore district. It is apt to prevail in the months of March, April, and May, and in October and November. The visitations of the later months are not so general and the type of cases not so severe as in the earlier months ; when cholera appears in the district, it breaks out simultaneously in different places, and no line of progress can be traced ; generally its conduct is most eccentric ; it will attack a portion of a village, a side of a bazaar, a few inmates of a house, and no rule or law can be discovered in its origin or progress.

Heavy falls of rain always check it, but if the rain is not sustained, it is apt to appear again with renewed vigour. Hot dry weather with strong dusty winds is the most favourable condition of its origin. The severity of cases varies greatly in different outbreaks and the type of cases also varies as regards severity of cramps, &c.

Twenty-two years in the Jessore Jail give the following figures :—

Annual admissions *per cent.* of strength	3·4
Deaths *per cent.* of strength *per annum*	·95
Deaths *per cent.* of cases treated	27·6
Admissions *per cent.* of total admissions	2·2
Deaths *per cent.* of total deaths	20·9

Admissions *per cent.* of strength in each month :—

January.	*February.*	*March.*	*April.*	*May.*	*June.*	*July.*	*August.*	*September.*	*Octr.*	*Novr.*	*Dec.*
·06	·13	·81	·97	·57	·35	·04	·05	·11	·08	·15	.09

5. *Diarrhœa.*—Precedes and accompanies cholera. There is also more or less diarrhœa always accompanying the annual outbreak of fever in October and November. The jail statistics for twenty-two years give the following results.

Annual admissions *per cent* of strength	11·3
Deaths *per cent.* of strength	·65
Deaths *per cent.* of cases treated	5·8
Admissions *per cent.* of total admissions	7·1
Deaths *per cent.* of total deaths	14·3

Admissions *per cent.* of strength for each month :—

January.	*February.*	*March.*	*April.*	*May.*	*June.*	*July.*	*August.*	*September.*	*Octr.*	*Novr.*	*Dec.*
·81	1·1	1·5	2·0	·93	·61	·84	·76	·78	·96	·52	·63

6. *Dysentery.*—Is very prevalent in Jessore. The months of August and September appear to be the worst. There are no statistics to show its prevalence among the general population, but judging from the experience of charitable dispensaries, cases must be very numerous.

The results of twenty-two years in the jail are as follow :—

Annual admissions *per cent.* of strength ..	6·7
Ditto ditto deaths.. ..	·57
Deaths *per cent.* of cases treated	8·6
Admissions *per cent.* of total admissions ..	4·2
Deaths *per cent.* of total deaths	12·5

Admissions per cent of strength for each month.—

January.	*February.*	*March..*	*April.*	*May.*	*June.*	*July.*	*August.*	*September.*	*Octr.*	*Novr.*	*Dec.*
·35	·38	·78	·65	·62	·38	·53	·70	·73	·49	·40	·50

The deaths from this disease among the general population must be very considerable.

7. *Small-pox*—Is a hot-weather disease. It often breaks out from inoculaltion, but I have not known any severe epidemic to occur in Jessore, and the cases occuring in the jail are very few. Varicella has been a very common disease in the Jessore jail of recent years.—

8. *Hepatitis*—In the form of chronic enlargement is very common. Acute hepatitis is also not an important disease, and I have seen in twenty-seven years about six cases of hepatic abscess in the dispensary.

EPIDEMICS.

An account of an epidemic of cholera in Jessore was published in the *Indian Medical Gazette* for 1867, and the disease prevailed extensively in 1868. It appeared soon after the cyclone, broke out here and there throughout the district all through the cold weather and disappeared in April, apparently in consequence of heavy rains.

FAIRS.

1. Narail in July attended by	15,000 people.
2. Gopalmoney in March	20,000 ,,
3. Soorkhally in July	10,000 ,,
4. Bodekhan in March	20,000 ,,

There is always more or less cholera developed at these fairs.

The only fair of which I have any personal knowledge is that held at Gopalmoney in March 1868; this I visited. I also deputed a native doctor to attend during the whole period of the fair. No cholera existed in the place previous to that fair, and whereas the cholera of the season was very mild, the cases occurring here were very virulent. Some fifteen cases occurred in all, and the disease subsided on the dispersion of the fair. This I was told was the case every year.

VACCINATION, INOCULATION.

There is only one vaccinator for the whole district paid by Government. He vaccinates in the jail and about the station, and goes into the district when ordered. In 1866, 473 persons were vaccinated, 213 successfully. In 1867—517, 319 successful. The better classes are in favour of vaccination and sometimes write for the vaccinator. The great bulk of the people, however, prefer inoculation.

The practice of inoculation is almost universal. Native inoculators go from village to village during the months of March and April, and inoculate all the children. Judging from the admissions into jail, all of whom are examined with respect to whether they have been inoculated or vaccinated, very few native children are not inoculated. The results are so far favourable that outbreaks of small-pox are rare, and I have not known of any very extensive fatal outbreak.

QUARANTINE, SANITARY POLICE.

I cannot perceive any advantage likely to accrue from quarantine.

The mode in which cholera breaks out throughout the district precludes the idea that any sanitary *cordons* would in any way limit the disease, and the hope of contracting the area of prevalence of fevers by such measures is equally futile. Small-pox is the only disease whose spread might be expected to be influenced by quarantine.

NATIVE PRACTITIONERS.

Kobirajes practise all over the district. I am not acquainted with the particulars of their mode of practice or the results of it. They frequently salivate, especially in syphilitic diseases, and the results of this are often most pernicious.

EPIZOOTICS.

Three forms of epizootic cattle disease are very common in Jessore, *viz.*, *puschima* or rinderpest, *gootee* or malignant small-pox of cattle, and *khorah* or foot and mouth disease. The last of these diseases was very prevalent in Jessore during the hot weather of 1868, all over the district; and in July and August, *gootee* prevailed to some extent in some parts of the Narail sub-division—one or other of these diseases occurs annually in some parts of the district.

5.—KISHNAGHUR, DISTRICT NUDDEA.

The report is signed by Dr. Roderick McLeod, but from the style it appears to have been written by a Native—perhaps the Sub-Assistant Surgeon.

" The district of Nuddea is in—

Latitude 22° 50′ to 24° 10′ *North.*

Longitude 88° 50′ to 89° 30′ *East.*

Intermittent fevers are common all the year round, and cholera usually breaks out sporadically about the months of March and April.

" Cholera broke out last March and April almost all over the district: in a few villages it was very severe. It appeared simultaneously in three or four different villages widely apart from each other, the outbreak lasted almost two months in all."

" The health of the Jail, Police Battalion, and the civil population was comparatively better than in previous years, and the number of persons who suffered from different diseases was also less. The daily average number of sick during the past nine months in the jail hospital was 6·79, in the Police hospital 4·75, and in the Kishnaghur Government charitable dispensary 59·35. In the jail, the ratio per 1,000 of daily sick to daily strength during the past nine months was 18·57, and that of mortality to daily strength 2·72. In the Police Battalion the ratio per 1,000 of sick to strength during the said period was 19·703 and that of mortality to strength 5·92. "

" Lepra is more common among Mahomedans than among the people of any other caste."

" The people of the district do not look healthy; they are not able-bodied, nor fit for hard work; they are mostly poor and indolent. "

" The district is supposed to contain just one million inhabitants; this calculation is based on enquiry made by the Police.

The natural fall of the country is four inches in the mile. The district is intersected by rivers and *khalls,* and by the dry beds of old rivers.

Sub-soil water is found in the dry season by digging twenty-five or thirty feet.

Tanks having been neglected, many villages are as much as two miles from the nearest water supply.

The following are the meteorological observations kept for the last five years:—

Meteorological observations for the last five years, at Kishnagur.

YEARS AND MONTHS.	BAROMETER.		THERMOMETER COMMON.		THERMOMETER IN SUN'S RAYS.		Rainfall.	Direction of wind.	General observations.
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.			
January 1864 ...	......	......	70	50	......	......	......	....	
February ,, ...	......	......	73	65	......	......	......	....	
March ,, ...	......	......	91	79	......	......	......	....	
April ,, ...	......	......	93	81	......	......	6·9	....	
May ,, ...	......	......	97	75	......	......	7·1	....	
June ,, ...	......	......	96	76	......	......	12·7	....	
July ,, ...	......	......	89	77	......	......	15·5	....	
August ,, ...	......	......	90	76	......	......	8·7	....	
September ,, ...	......	......	95	76	......	......	5·1	....	
October ,, ...	......	......	89	70	......	......	12·8	....	
November ,, ...	......	......	84	61	......	......	1·1	....	
December ,, ...	......	......	70	59	......	......	......	....	
January 1865 ...	......	......	74	58	......	......	......	....	
February ,, ...	......	......	82	60	......	......	2·8	....	
March ,, ...	......	......	92	66	......	......	1·8	....	
April ,, ...	......	......	94	73	......	......	3·1	....	
May ,, ...	......	......	99	76	......	......	22·6	....	
June ,, ...	......	......	89	75	......	......	12·0	....	
July ,, ...	......	......	89	77	......	......	7·0	....	
August ,, ...	......	......	84	78	......	......	5·5	....	
September ,, ...	......	......	84	80	......	......	11·4	....	
October ,, ...	......	......	86	78	......	......	......	....	
November ,, ...	......	......	84	69	......	......	......	....	
December ,, ...	......	......	85	61	......	......	......	....	
January 1866 ...	......	......	82	60	......	......	4·6	....	
February ,, ...	......	......	84	60	......	......	2·0	....	
March ,, ...	......	......	93	71	......	......	......	....	
April ,, ...	......	......	97	74	......	......	3·6	....	
May ,, ...	......	......	100	73	......	......	1·5	....	
June ,, ...	......	......	94	80	......	......	17·0	....	
July ,, ...	......	......	87	78	......	......	7·0	....	
August ,, ...	......	......	89	79	......	......	2·8	....	
September ,, ...	......	......	89	78	......	......	5·6	....	
October ,, ...	......	......	87	73	......	......	3·9	....	
November ,, ...	......	......	87	73	......	......	......	....	
December ,, ...	......	......	85	77	......	......	......	....	
January 1867 ...	30·000	30·000	79	54	......	......	......	N—S.	
February ,, ...	30·000	29·750	87	60	97	80	.4	S—S—S.	
March ,, ...	29·925	29·750	89	68	99	83	·5	S—S—S.	
April ,, ...	29·850	29·625	99	75	103	94	1·5	S—S. W—S. E.	
May ,, ...	29·725	29·350	105	76	......	......	3·7	S. E—S. W—S. E.	
June ,, ...	29·650	29·300	100	78	......	......	6·3	S—S. E—S. W.	
July ,, ...	29·650	29·275	90	78	116	79	9·7	S. E—S—S. E.	
August ,, ...	29·600	29·350	96	78	122	78	8·8	S. S. E—N. W.	
September ,, ...	29·750	29·325	92	79	118	79	14·3	S—N. W. S.	
October ,, ...	29·875	29·650	89	71	120	62	8·1	N.W—N.W—N.W	
November ,, ...	30·075	29·200	81	63	126	62	3·1	S—E. S.—N. W.	
December ,, ...	30·025	29·875	77	60	114	52	......	N—N—N.	
January 1868 ...	30·025	29·800	76	58	108	54	......	N—N—N.	
February ,, ...	30·012	29·618	81	55	112	57	·3	N—W.	
March ,, ...	29·975	29·675	87	63	180	60	1·0	S.	
April ,, ...	29·900	29·500	88	74	114	65	4·7	N—W. S—E. S.W.	
May ,, ...	29·900	29·500	89	76	120	70	10·3	S—S. S—W.	
June ,, ...	29·725	29·25	93	79	112	72	11·2	S—S—S.	
July ,, ...	29·65	29·40	92	79	106	71	11·4	S—S—S.	
August ,, ...	29·80	29·26	90	80	112	69	30·2	S—S—S.	
September ,, ...	29·80	29·45	89	79	114	75	7·3	S. S—E.	
October ,, ...	29·93	29·60	88	73	114	64	......	....	

Well water is not considered good, and the people avoid it. The district, as compared with others is not well wooded. A good deal of grain is imported from the eastern districts.

No sanitary precautions are usually adopted; the villages abound with dirty holes. Few tanks are clean; most of them are full of vegetation; no care is taken to prevent pollution; these remarks apply to the villages in the interior of the mofussil. The roads are not kept clean, the dwellings are always overcrowded, people ease themselves on the banks of their drinking tanks. Cremation is imperfectly conducted, after which the body is thrown into the stream, the place being marked by a bamboo stake which remains there till the water carries it away. No care is taken to perform these obsequies at a distance from human dwellings. The graves of Mahomedans are usually in the small square forming the residence of the deceased's family; the body is deposited not ten yards from the door of the house. Dead animals are thrown out on waste lands near the village.

Some years ago fever prevailed in an epidemic form, it seemed to take a north-westerly course, and it manifested itself in its most fatal form in villages where the laws of sanitation were most neglected. Fairs are very seldom attended by any unusual amount of disease. Vaccination is carried on through municipal agency in the towns of Kishnaghur, Santipore and Ranaghât, and by Government native vaccinators throughout the district, The total number of successful vaccinations in 1866-67 was 1,411, in 1867-68. it was 1867."

6.—BERHAMPORE.

THE REPORT IS BY DR. A. FLEMING, SURGEON-MAJOR.

1. Berhampore, *North Latitude* 24° 5.
East Longitude 81° 7′.

3. "For Europeans who take moderate care of themselves, I believe Berhampore is as healthy, if not more so than most other Lower Bengal stations,

For natives it is undoubtedly an unhealthy place.

4. I am not aware that the present condition of Berhampore is in any way different from the past.

Elephantiasis is very common and often follows attacks of fever, beginning as phlebitis of the larger veins of the legs. Leprosy is not uncommon, but these diseases are not peculiar to the district.

9. No data, but the infantile mortality is believed to be very great.

10. Fever has been very prevalent during the past autumn, but not much more so than is frequently the case. The cause of the prevalence of fever in and around Berhampore, I ascribe to the great extent of flooded ground, the imperfect drainage, bad conservancy arrangements, and great amount of rank vegetation. The unusually heavy rain-fall during the present year at Berhampore may to some extent account for the sickness which has prevailed.

11. Sickness at Berhampore prevails to the greatest extent in September, October, November and December, being the period during which the country is drying up, and in which months the thermometric range increases, and the humidity is extreme, especially at night and early morning.

Cholera generally visits Berhampore in October or November, when the sandbanks in the river begin to dry up, and again in the months of March, April and May.

12. I have not observed any particular difference in the health of different classes of natives.

13. Most sickly. The people of Berhampore are as a rule a miserable indolent and apathetic race: many are very poor, and deficiency of food and clothing are an obvious cause of the sickness. Many drink spirituous liquors largely and smoke *ganja.*

During my residence in Berhampore for the past seven years, its sanitary state has remained the same, and recommendations made for its improvement have been unattended to in great measure.

14. No data of any kind to be depended on. The population of the district as roughly estimated in 1860 by Captain Gastrell, Revenue Surveyor, at five souls per house, was 1,100,080. No information as to age or sex. The proportion of Hindoos and Mussulmen is said to be as 1·78 to 1·0. No registration of births and deaths has ever been attempted, that I am aware of.

TOPOGRAPHY.

15. Berhampore may be described as situated on an alluvial plain traversed by parallel *jheels* which are supposed to be old beds of the river Bhagiruttee, on the left bank of which the station and town are built. It is well wooded, and under and among the larger trees a dense undergrowth of

jungle occurs. The soil is formed of alternate layers of clay and sand, and is evidently of fluviatile origin. No rocks occur in the district that I am aware of.

The river Bhagiruttee, during the cold and hot seasons drains the neighbourhood of its banks effectually, but during the rise of the river, which often reaches twenty-eght feet, its level is in some places above that of the country on its banks, and *bunds* are necessary for its protection. During the rise of the river, therefore, there is literally no drainage for the surface water which collects in tanks, *jheels*, and hollows, to evaporate during the dry season, generating a vast amount of malaria. During the rains the water in wells is almost on a level with the ground, but in the dry season four to six feet from the surface may be taken as the average depth of subsoil water at some distance from the river.

There is no irrigation in this district, the cultivation of crops being entirely dependent on the rain-fall on the or rise of the river.

The numerous *bunds* arranged in all directions along the left bank of the Bhagiruttee, to prevent flooding of the country, doubtless as the river subsides, interfere with surface drainage by retaining inside their surface water which otherwise would drain into the deep cold-weather bed of the river.

For a general description of Berhampore, see a report by Staff Surgeon, Lamprey, in the *Army Medical Reports for* 1862.

Everywhere around stagnant holes, swamps, &c., are to be seen, surrounded by dense jungle, to drain which effectually would not only require a large expenditure of money but could only be properly executed by a professional Engineer. The great recipients of the surface water around Berhampore are the Kalkapore *Jheel* on the north, and the Chultea *Jheel* on the south. The former is connected with the river by a sluice gate, through which, as the river falls, it can be drained to the extent required to drain off the surface water from the north end of the station. The Chultea *Jheel* has no such arrangement, and consequently there is no exit for the surface water which collects to overflowing in all the holes, tanks and *Jheels* on the south side of Berhampore, making the Ghora bazaar, Police Lines, Vakeelabad and the surrounding neighbourhood a perfect hot-bed of fever.

To remedy this I would suggest that all the drains, ditches, tanks, and holes should be so arranged as to throw their water into the Chultea *Jheel* and that from its end nearest the river, a canal be cut to the river and furnished with suitable sluice-gates on the same plan as those on the Kalkapore *Jheel*, which, when properly managed and kept in proper order, are found to answer well. I do not urge the entire drainage of the Chultea *Jheel* even if this were possible, only the advantage of having the power to lower the level of the water in it sufficiently to drain into it the surface water which now stagnates after heavy rain in its neighbourhood.

It may possibly be found that a slight fall in the level of the country eastward to the Gobra *Nullah* may permit of the drainage of Berhampore in that direction, but this is a point which can only be settled by a professional Engineer.

The plan of drainage now in existence as regards the Kalkapore *Jheel* answers well, except for three months of the year, *i. e.*, when the river is at its height during the rains, and I believe the same plan applied to the Chultea *Jheel* would answer equally well as regards the south side of the station.

From observations of the flooded state of the country during the rains between Berhampore and the Gobra *Nullah*, I very much doubt the possibility of draining Berhampore in that direction at the period when the river is too high to permit of draining the station into it, which can without the slightest difficulty be done for nine months in the year.

Meteorology, Climate, &c.

The average mean temperature of Berhampore for five years preceding

1866 was	77·29
Ditto ditto of 1866	78·93
Ditto ditto of 1867	79·20
	235·42

The average of seven years is therefore	78·44
The mean monthly range of 1867 was ...	11·08°
The highest range in January 1867 ...	16·3°
The lowest ditto in August ,, ...	6·5°

The mean annual barometric range of 1867 as ascertained by an aneroid barometer, was 0·145.

Monthly meteorological returns have for 1868 been forwarded to the Meteorological Reporter, Calcutta, for arrangement.

The average annual rain-fall for eleven years previous to 1868 was 54·16 inches.

The greatest rain-fall occurs in July and August, and the least in January and December.

Northerly winds prevail during the cold season; west and south-west during the hot, and south and south-east winds during the rains. Fogs and heavy dew at night and early morning occur throughout the cold weather.

Thermometric observations as well as a record of rain-fall have been kept by the Civil Surgeons of Berhampore for many years, and their reports have been monthly forwarded to the Medical Department.

The year 1868 was characterized by the rains setting in early with an unusually heavy fall in May of 8·12 inches. In June 12·71 inches fell, which is far above the average. In July only 8·40 inches fell while in August the large fall of 18·07 inches was registered—the average fall of twelve previous years being 10·13. No rain fell after 4th October. The total rain-fall for the year has been 62·1 inches.

It is believed that the unusually heavy rain-fall in Berhampore did not extend to all the district, and the want of rain in the Upper Provinces caused an unus ually small rise in the river Bhagiruttee which never attained a greater height than 23 feet 2 inches which was registered on 18th and 19th August.

Great dampness is the chief peculiarity of the Berhampore climate.

The cold weather may be said to last from November to February, January being the coldest month, showing in 1867 a mean temperatnre of 65·9°.

March, April and May are the driest months, the latter being the hottest in the year, with a mean temperature in 1867 of 87·9°. The rainy season lasts from June to October; the greatest amount of atmospheric humidity occurring in August, the mean of that month in 1868 being ·86 as deduced from observations made at 9-30 A. M. and 4 P. M.

IRRIGATION, CROPS, WELLS, &c.

Wells it is believed only exist in and near the larger villages and towns." They as a general rule are small and temporary, the sides being formed of rings of burnt clay (pottery) let down one above another, till the water is reached. *Pucca* wells are scarce; tanks are numerous and nearly every village has several in its neighbourhood.

Mulberry is largely cultivated throughout the year, in and around villages, to feed silk worms. Food is generally cheap."

SANITATION, CONSERVANCY, &c.

" In Berhampore the main roads are kept clean and tidy, and the filth thrown out of the houses at night is carted away in the morning, but in all the side lanes and *gullies* there is not the least attempt at cleanliness, and the general sanitary state of the town is as bad as it can be; dirty uncleaned privies, putrid cesspools and rank vegetation abounding every where.

There is a municipal committee, with the Magistrate at its head, composed of both European and Native gentlemen, whose duty it is to supervise and enforce sanitary regulations. Under this committee are sub-committees, with a secretary to each, to supervise different parts of the municipality; but there is a want of real active interest in the matter of sanitation, and I believe a great want of funds to carry out improvements. Though it is desirable in all attempts at sanitation to carry along with us the sympathies of the Native gentlemen of the place, yet I believe nothing really valuable will be done unless the Magistrate or head Police Officer takes a warm and energetic interest in the matter, looking into every thing themselves and not being merely content with giving general orders, which are worth only so much waste paper; obvious sanitary improvements have been proposed from time to time, but beyond an occasional spurt of cleaning up thoroughfares, these have not generally been carried out.

The proper drainage of, and preservation of cleanliness in, the Gorah-bazaar, which the European soldiers frequent, and which is close to their barracks, has been often urged by me without effect. There is no regular system of drainage, and every occupant of a house is allowed to have a covered drain or cesspool under his door, into which every kind of filth is thrown. I have urged the necessity of stopping this practice, and the formation of shallow saucer-shaped drains, arranged on levels, so as to carry the refuse water into the river, and the removal of all solid refuse and filth by carts, to be burnt or buried.

a. The local causes of malaria all abound in perfection in Berhampore and have already been alluded to.

b. The river, tanks and wells are the sources of drinking water, but the natives, when thirsty, are not at all particular where they drink or from what source. The water generally is charged with calcareous matter held in solution by carbonic acid.

It is wholesome and has been analyzed by a staff of analysts under the chemical examiner.

The natives of Berhampore who can afford to send for it, get their drinking water from a tank in front of the sepoy lines, which is the purest water in Berhampore.

The water supply is at all times abundant.

Many of the tanks are subject to contamination by surface drainage into them, by the growth and death of weeds, &c., and by cattle wallowing in them.

The wells in the station generally yield a less pure water than the tanks, and some of them in addition to lime, yield on analysis a considerable amount of chlorides, doubtless derived from drain-sewage percolating into them. The station surface drains run close to some of the wells, and are not kept in such good order as they ought to be, so as to prevent sewage soaking through them into the soil beneath.

The wells themselves are open, but are surrounded by a *pucca* platform, to exclude surface water.

They are occasionally cleaned out, but sufficient attention is not paid to the annual removal, from the sides of the tanks used for drinking purposes, of the dead weeds left on the drying up of their banks in the cold and hot season.

In many of the tanks from which drinking water is obtained, natives bathe; but in the most frequented station-tanks this is not allowed.

The same remarks apply as to washing. In the station, washing is only allowed in certain tanks, but *out of it* the processes of drinking, bathing, and washing may be seen going on simultaneously in frequent instances. Cattle, of course when loose, go any where they can get water, and village pigs wallow in the nearest pond.

In cantonments, animals are as a rule not allowed to frequent the drinking tanks.

Jute as a general rule is not steeped in the sources of drinking water, but bamboos I have frequently seen soaking in tanks the water of which was freely drunk.

The river Bhagiruttee is the common receptacle of dead Hindoos, and in the cold and dry weather it is most offensive. I have repeatedly urged the necessity of stopping the practice of throwing bodies into the river, and the establishment of burning ghâts, but hitherto without effect. In the month of December, I one morning counted seven bodies stranded on the sides of the river, in a space of about a mile, in all stages of decomposition, and this between the towns of Berhampore and Moorshedabad, a large proportion of the inhabitants of both places regularly consuming the river water. This I should mention was at a time when cholera was prevailing in the district, and the bodies of those who died were constantly being brought to be thrown into the sacred stream.

c. The lower classes dwell in thatched mud huts, stuck down without order or regularity, the mud forming them being obtained from a hole dug in the vicinity, which afterwards becomes the family cesspool, and in time gets overgrown with brushwood and full of filth of all kinds.

d. Any thing deserving the name of drainage does not exist in the town of Berhampore or Gorah-bazaar. The general system of drainage of the locality has already been noted.

No public latrines exist. Some years ago some were erected, but they were not frequented and were abandoned. They are much required especially for the cantonment servants and camp followers, and their use should be enforced.

The "*drop-privy*" for want of a better name, seems to be the one in use.

Dry earth is only used in Government establishments.

The ordure in the native privies is but seldom removed, and most of them are in a disgusting state. Those who have not privies in their houses use the nearest patch of jungle as a privy. Ordure is never I believe buried, but if removed at all is merely thrown into the nearest holes. This applies to the ordure from native houses. The *excreta* of the sick are not treated in a different way from those of healthy people.

e. Accumulations of filth, stable-litter and refuse are thrown into the first convenient hole. In Berhampore and Gorah-bazaar this is removed from the main streets, of a morning, by conservancy carts and a sweeper establishment. That of the former is deposited at the north-east end of the Kalkapore *Jheel,* while that of the latter is carted down and deposited on the bank of the river about one-fourth of a mile below the bazaar. Cow-dung is carefully collected and dried for fuel.

Filth is but little utilized for agricultural purposes,—mulberry being the only crop I have seen it applied to.

f. The burning of bodies is carried on any where on the bank of the river except within cantonment limits. It is done in a most imperfect way; and the poorer Hindoos save themselves all trouble and expense by simply depositing the bodies of their dead relatives in the river to feed the fishes, dogs and vultures. Bodies are interred at all depths, but few of the graves exceed four feet in depth. Grave-yards occur in the middle of the town, by the sides of and on the public roads, near Mussulman mosques, and in all sorts of localities. Some restriction as to the places of burial is urgently needed.

g. Most of the butchers live at the lower limit of the Gorah-bazaar, killing the animals at their houses. The neighbourhood of their houses is very filthy and offensive in hot weather, and the offal they dispose of as they best can.

h. Tanneries are a great nuisance, but they are not numerous. The general filthy state of the towns and villages has a far more injurious effect on the public health.

There are no brick-kilns in the immediate vicinity of Berhampore.

i. The stenches one meets with every where in the lanes of Berhampore or in the villages around can be more easily fancied than described.

j. As a rule, natives in their houses are cleanly, and ablution is frequently practised. Outside their houses they dont care how much filth exists or where it is deposited. They are too poor to pay for its removal, and too lazy to remove it themselves or bury or to burn it. They are not at all particular where they bathe—the nearest muddy pool seems to please them as much as the clearest stream.

k. Fish enters largely into the diet of those who can get it. This with rice, *dál*, and the ordinary vegetables forms the staple food of the population. Meat is but little used. The poorer classes consume stinking fish largely, buying up the bazaar refuse. Rice is the staple food of the district and *attah* is but little used. I believe the lower classes as a rule are badly fed, and from this cause and the malarious character of the district, they are a wretched weakly race, indolent and apathetic to an extent I have never seen equalled in any part of India.

l. Insufficient clothing and deficiency of food of a sufficiently nourishing nature are, I believe, obvious sources of disease in the district.

(m.) "Drunkenness from *toddy* is, I believe, very prevalent and injurious; *gunja* is also largely consumed, and tobacco smoking is largely indulged in,—to an extent which undoubtedly is injurious. Spirits from the government distilleries are also in great demand, but they are dear and only available to the better classes. A slightly intoxicating drink is made from rice by fermentation, which is a good deal used."

SPECIFIC DISEASES.

1. "*Fevers*—Of an intermittent and remittent nature are extremely prevalent throughout the district and cause great mortality. They are most prevalent from the end of the rains throughout the cold season up to February or March. The remittent fevers are frequently complicated with great hepatic derangement.

2. *Cholera*—Occurs generally every year at the beginning of the cold weather, and again in March, April and May; cases prevail throughout the year, and the disease I believe to be endemic in the district. In November and December of the present year it has prevailed to a considerable extent among the villages along the Jellinghee and around the Kuluntra *Jheel*, and shortly after appearing there its occurrence was reported at villages throughout the district.

3 & 4. *Diarrhœa and dysentery*—Are extremely prevalent throughout the cold season, and extremely fatal to those previously debilitated by fever.

5. *Small-Pox*—Generally appears in February and March, and seems to be imported and spread by the inoculators who visit the district annually, coming I understand from the Burdwan District.

6. *Hepatitis*—Is not uncommon, and I have seen many cases of its terminating in abscess, and the cure of the latter by tapping. *Splenitis*, both acute and chronic, is as might be expected very prevalent, and *elephantiasis* very common, generally dating its commencement from a severe attack of fever. In a large proportion of the cases, *crural phlebitis* has attended the enlargement of the limb, if it has not caused it."

STATISTICAL RECORDS.

"No statistical records exist of the mortality from disease in the district. The Police reports are of the most vague and careless description, and are not I believe in the least to be trusted.

Relapsing fever I have not seen in the district."

EPIDEMICS.

" No particular epidemics have visited Berhampore, to which my duties confine me, during the seven years I have held charge. Of district epidemics I have no statistics or records.

The fever which prostrated so many of the soldiers of Her Majesty's 25th Foot this season, was probably the result of crowding the men into Barracks not adapted to receive so large a number, as has always on previous occasions caused like sickness at this station. During the six previous years I have been here, when never more than three companies of Europeans occupied the barracks, they have been as healthy as they well could be, and the health of some of the detachments has equalled that of troops at Dugshaie. I do not doubt that the overflowing of the chain of tanks this season behind the Catholic Chapel, and the filthy state of their margin (which was resorted to as the latrine of the barrack coolies and servants) had some effect in increasing the sickness, but as this did not affect generally, more than usual, the residents of Berhampore, we are bound to admit that the sickness of the European soldiers in the barracks was due to a local cause, and the overcrowding of the men I believe to be the true one."

FAIRS.

" The fairs in this district are held at Shagurdighee, Harirampore, Sheikparah, Rughonathgunge, Kandi, Choawa, Lallgolah, Shohey, Pakey, Chalteah and Kupuleshar. These fairs are held periodically during the cold and dry seasons, commencing in November and ending in May. The number of people attending varies from 150 to 4,000. The above information was supplied by the Magistrate. The Chalteah Fair is the only one I know anything about, and is on quite a small scale.

I have no facts to prove that these fairs are a source of disease. At Chalteah Fair, cholera, during my residence here, has once or twice broken out, but this at the season of the fair is likely to occur at any other place, when a number of people are collected and when most insufficient measures are adopted to ensure cleanliness."

VACCINATION.

" It is not carried on in the district at all. Government only allow two vaccinators, one of whom works in Moorshedabad and its environs, and the other at Berhampore.

The people are prejudiced against it, and the vaccinators have to go from house to house begging for patients."

"Inoculation is largely practised, and I believe with generally favorable results. Nearly every adult has the inoculation mark on his arm."

QUARANTINE, SANITARY POLICE.

"I believe that as regards cholera, quarantine regulations are as a rule futile and annoying, and cannot be strictly enforced in the present state of the country. Some restriction might be imposed on inoculation, but unless Government are prepared to interdict it altogether, I do not see how small-pox can be checked except by increasing the vaccinating establishment. Neither do I see how the practice of vaccination can be rendered compulsory, and in the absence of vaccination, inoculation is an undoubted benefit."

NATIVE PRACTITIONERS.

"I know little of them. They are very numerous, utterly uneducated, and do an immense deal of harm. I think their influence is rapidly decreasing with the spread of education and dispensaries."

INDIGENOUS DRUGS.

"I have nothing to observe on this head that is not generally known, with the exception of the use of the raw *papya* fruit to reduce enlarged spleen; the green unripe decorticated fruit, eaten with salt, undoubtedly has a remarkable effect in reducing an enlarged spleen; a small slice is a sufficient dose for an adult, and generally produces several watery stools. A respected planter, H. Deverell, Esq., of this district, dries the green *papya* fruit in slices and finds it equally efficacious at all seasons of the year."

FURREEDPORE.

THE REPORT IS BY DR. BHOLANATH BOSE, THE CIVIL SURGEON.

Latitude. 23° 41′ *North Longitude* 89° 52′ *East.*

"Fairly healthy.

We have better roads now than formerly; the drains such as they are, are better kept; the town is more cleanly; water more carefully conserved, and on the whole there is less jungle and filth. Happily too, the people are beginning to take a more lively and intelligent interest in all that appertains to their physical welfare than of yore.

Cholera as a rule occurs only sporadically.

Both lepra and elephantiasis are extremely rare.

From general observations I am disposed to think that mortality among children is not great. Diseases of dentition are seldom seen, and scrofulous affections still less."

" In the month of May a large village called Kasheanee, situated in the south of the district, suffered much from fevers of a low intermitting and remitting type, and a number of people were carried off by the disease. The mortality was, however, chiefly confined to those weakly and sickly persons who had long been previously ailing either with large spleens or some other forms of chronic malady. The fever was plainly traceable to malaria, intensified by the usual insanitary conditions which always more or less exist in a Bengallee village. In the present instance, the site was low, surrounded by some swamps, and vegetation was choking; drains and roads there were, properly speaking, none; a water supply most scanty and stagnant in the extreme, was derived from a few neglected tanks; filth and squalor, of course, also obtained.

Towards the middle of November a most fatal form of cholera suddenly invaded the town of Syedpore on the Barassia, about twenty miles from the station, and before help could arrive, had already produced a considerable havoc. Of 135 persons attacked about three-fourths were reported as having succumbed. The disease continued at its height up to the close of the month; it then gradually declined, until it ceased entirely, by the 12th or 13th of the following month. The infection was attributed to the fouling of the water after the cyclone, added to the exposure and distress attendant on the calamity. I should, however, here mention that cholera had been prevalent for some time before the cyclone, in the adjoining parts of the Jessore District, and it is therefore not improbable that it was simply imported from the opposite bank.

The same disease showed itself again sporadically in March this year, almost simultaneously at several points of the district, and prevailed rather extensively in some villages near the Muttakhally Out-post, along the river Chandona, on the confines of Pubna.

Scattered cases also occurred a few weeks later in the station, viz., all through April, and at the same time in the adjoining villages. By the middle of May, the scourge had entirely disappeared from the district.

Prisoners in jail, although leading a confined life, appear to suffer less than the outer free population."

Dr. Bose has submitted returns relating to the health of the Police, during the years 1866-67. In 1866 the average death rate per 1000 is stated to have been ·15, in 1867 it was ·12.

" Generally speaking, the people of the upper classes and the comparatively abstemious and vegetable-feeding Hindoos would seem to be more subject to disease than those of the *Chussa* class, and some meat-eating and generally better fed Mahomedans. The causes of the difference are obvious, from the respective habits, mode of life, and dietaries of these classes. The *Chassa* is a more active being, lives more in the fresh air, and by the nature of his occupation is obliged to be more regular in his habits than his indolent, irregular, and home-confined neighbour. The Mahomedan of course has the advantage over the Hindoo of being less restricted in his food, and consequently the better nourished of the two.

I cannot say that the place has deteriorated in health although it is doubtful if it has at all improved."

Estimated population of the District.—

Men.	Women.	Children.	TOTAL.
1,66,500	1,85,000	2,73,255	6,24,755

The above can be taken as only approximately true. The principle of calculation is based on the assumption that there are, on an average, five individuals to each house.

The relative proportion of men, women and children is not to be depended on.

There is a general gradual inclination of the country from north-west to south-east. The extent of the fall, however, has not been ascertained. On an average the sub-soil water is about eight feet from the surface.

The river Chandona has gradually silted up, and is now in many parts almost dry during the hot season, and in consequence said to be a source of much sickness along its banks at that period of the year. Diarrhœa mingled with cases of cholerine are said to be then often very prevalent.

The station is sufficiently elevated to be just above the flood level of the Ganges. No silting occurs in the river here.

The whole district is more or less under water during the rains, owing to the annual overflowing of the Ganges. The flood generally comes on by the end of June, reaches its height in July, or sometimes even later, as this year in August, and then gradually subsides, the country getting quite dry again by October and November, excepting a portion to the extreme south.'

METEOROLOGICAL

Meteorological Table shewing the Thermometrical and Hygrometrical of Furreedpore for

MONTH.	BAROMETER.						HYGROMETER.						THERMO					
	1 A. M.			4 P. M.			DEW POINT		ELASTIC FORCE OF VAPOUR.		RELATIVE HUMIDITY.		EXPOSED.					
													In Sun's rays.			*Mean @* 10 A. M.		
	Maximum pressure and date.	Mean.	Maximum pressure and date.	Maximum pressure and date.	Mean.	Maximum pressure and date.	10 A. M.	4 P. M.	10 A. M.	4 P. M.	10 A. M.	4 P. M.	Maximum and date.	Mean.	Maximum and date.	Maximum and date.	Mean.	Maximum and date.
January ...	...	...	...	...	...	...	58·52	59·41	...	...	75·16	66·89	28th, 29th 70·0	... ...	3rd 58·0	...	65·0	...
February ...	...	...	...	...	...	..	61·61	58·19	...	...	78·89	63·93	30th 86·0	... ...	8th 64·0	...	68·58	...
March ...	...	...	...	...	...	...	67·46	66·13	...	...	76·80	59·09	26th 84·0	... ...	11th 68·0	...	75·83	...
April ...	...	...	...	...	...	...	74·77	78·46	...	...	81·1	78·03	21st. 22nd 84·0	... ...	5th 74·0	...	81·23	...
May ...	...	...	...	...	...	...	77·11	78·42	...	...	83·61	75·22	28th, 29th 86·0	... ...	12th 76·0	...	82·48	...
June ...	...	...	...	...	..	...	79·97	80·11	...	...	91·66	86·86	5th, 6th 87·0	... ...	29th 78·0	...	82.86	...
July ...	...	...	...	...	...	...	80·21	80·93	...	...	88·33	87·70	7th, 8th 85·0	... ...	23rd 81·0	...	83·93	...
August ...	...	...	...	...	...	...	80·31	80·80	...	...	89·48	87·12	9th, 10th 87·0	... ...	14th 81·0	...	84·25	...
September ...	...	...	...	...	...	...	80·57	80·25	...	...	89·33	88·53	16th 87·0	... ...	5th 81.0	...	84·16	...
October ...	...	...	...	...	...	...	70·23	73·58	...	...	78·32	72·0	5th, 6th 85·0	... ...	31st 76·0	...	81·45	...
November ...	...	...	...	...	...	...	66·84	67·51	...	...	77·03	69·83	6th, 7th 78·0	... ...	30th 70·0	...	74·83	...
Total ...	...	...	...	...	...	...	797·60	803·79	...	...	835·22	919·0	807·0	...	907	...	864·60	...
Average...	...	...	...	...	...	...	66·46	66·98	...	...	69·60	76·5	67·2	...	75·5	...	72·05	...

APPENDIX B.

readings, rain-fall, direction of the wind, &c., in the Civil Station
the year 1868.

METER.							RAIN.				WIND.									
In Shade.					Six Inches below ground.						No. of days it blew in certain directions.									
Mean @ 4 P.M.																				
Maximum and date.	Mean.	Maximum and date.	Mean daily range.	Monthly mean temperature.	10 A.M.	4 P.M.	No. of days it fell.	Maximum fall.	Total fall.	Ozone.	North.	North-East.	East.	South-East.	South.	South-West.	West.	North-West.	Calm.	Force.
...	70·80	...	...	5·80	...	...	...	...	...	...	28	...	...	...	2	...	...	1	...	...
...	73·34	...	...	4·76	...	...	1	...	2·6	...	9	...	...	1	2	...	...	8	10	...
...	81·87	...	...	5·04	...	...	3	·6	1·2	...	6	2	...	1	11	...	...	6	5	...
...	85·06	...	...	3·83	...	...	9	·9	4·6	..	...	2	...	2	18	3	...	2		...
...	85·87	...	...	3·39	...	...	10	2·8	9·1	...	...	2	...	...	19	1	...	2	6	...
...	84·40	...	...	1·54	...	...	18	2·1	13·5	...	...	...	...	7	16	2	1	...	4	...
...	85·06	...	...	1·13	...	...	12	·7	4·9	...	...	...	...	1	30	...	...	...	...	...
...	85·87	...	...	1·62	...	...	13	8·0	16·0	...	...	...	...	...	23	...	...	...	8	...
...	84·13	...	...	·3	...	...	13	1·3	10·6	...	...	...	1	6	16	...	...	...	7	...
...	83·25	...	...	1·80	...	...	...	...	...	...	11	...	...	...	...	...	...	...	20	...
...	77·93	...	...	3·10	...	...	...	...	...	...	25	...	...	1	...	...	...	...	4	...
...	897·58	...	...	32·54	...	...	79	16·4	62·5	...	6	6	1	19	137	6	1	19	67	...
...	74·79	...	...	52·71	...	...	...	1·3	5·2	...	...	...	...	...	...	...	...	...	...	...

Dr. Bose has furnished the Meteorological Returns for the years 1866-67 with remarks on the same; but, as 1868 is the year now immediately under review, these are here omitted.

Dr. Bose has also given a detailed and interesting account of the Cyclone of 2nd November 1867.

"The climate of Furreedpore like that of Eastern Bengal, is excessively damp, but tolerably equable. By the end of June the greater part of the district is under water. In the Autumn months paludal fevers of a bilious character more or less prevail.

The heat is never excessive, and it is by no means uncommon for a hot season to pass without the thermometer ranging above 86° or 87° in the shade, the air being cooled by southerly breezes. Sporadic cases of cholera are usually to be met with more or less in all parts of the district during this period.

From the peculiar humidity of the climate, I need scarcely say that generally speaking it would be ill-suited to persons of a rheumatic, neuralgic and scrofulous habit, and those subject to fevers and catarrhal affections generally.

The depth of water from the surface in the summer varies from 3 to 5 feet. In the winter it is about 16 feet."

Dr. Bose has given a careful list of the trees most abundant in the Furreedpore District, with their scientific and native names. I am sorry to be obliged from want of space to omit this catalogue from the present Report.

Dr. Bose's account of the Spring, Autumn and Winter crops is also very careful, but it is too long for reproduction.

The food of the district is said to be cheap on the whole. The produce of the past year was above the usual average.

On the subject of "Sanitation, Conservancy &c." Dr. Bose writes as follows:

"Having so lately as March last, in a paper addressed to the Magistrate, entered at some length on the sanitation and existing state of conservancy of the district, I cannot possibly do better than take the liberty of herewith submitting copy of my letter in question."

The letter referred to consists of 45 pages of manuscript; it is too long to be reproduced in such a Report as the present. It treats successively of food, air, water, habitation, soil and conservancy. Dr. Bose recommends a careful inspection of all articles of food in the bazaars, chiefly on market days. He draws particular attention to rice, dâl, ghee and butter, mustard oil, common salt, sugar, fish and milk. The Furreedpore fish market he characterizes as a great nuisance. The best specimens of milk sold in the bazaar are said to contain "not less than 25 per cent, and sometimes as much as 40 or 50 per cent of the nearest tank water."

Regarding the purification of water, Dr. Bose writes:

"The two best chemical agents to employ for the purpose, and which are at the same time very cheap and easily obtained, are alum and the ordinary clearing nut (*Strychnos Potatorum*). One *ruttee* of alum to every seer of water, and just a few rubs with the nut inside the water-vessel, will generally suffice."

Dr. Bose recommends the thinning of aquatic plants growing in water, with the exception of certain kinds of *Valisneria*, such as that which the natives called "*Pata sewalla.*"

The drainage of the Police lines near the magazine is recommended, and the piece of land to the south-west of the *Mela* ground, both of which spots are said to be low and notoriously detrimental to public health.

Regarding conservancy Dr. Bose writes as follows:

"I dare say, if the natives generally knew the *rationale* and the advantages of the dry-earth system of deodorization they would, for the most part, readily take to it without further persuasion. One good way of disseminating this knowledge would be to introduce it in all the schools and colleges, and also to enforce the practice in public latrines wherever any exist."

With regard to improvements already effected Dr. Bose writes:

"I may mention that in the station a few tanks have been deepened, and some of the station roads have been made *pucka.* Moreover, orders have been passed by the Magistrate to the Police, to see the jungle cleared throughout the district, but I fear as yet with no satisfactory result."

On the subject of water, the following remarks occur:

"Marsh water to which the people in the southern swamps are confined is of course unwholesome.

Three years ago during the rainy season I made a rough analysis of the water of the Ganges opposite the station; the results were as follow:

I found that the impurities were more of a mechanical than of a chemical character; that is, they consisted more of matters held in suspension than in chemical union."

" It mixed well with common soap. The quantity of solids was found to be about ¼ of a grain to the ounce, or 40 grains to the gallon.

The re-action was neither acid nor alkaline.

A portion of the sediment, viewed under the microscope appeared to consist of the following substances :

1.	Angular particles not removed by addition of acid	*Grains of sand.*
2.	Rounded or angular bodies disappearing by acid re-action	*Carbonate of lime.*
3.	Still smaller particles of loose structure with no particular shape scattered about or holding together	*Clay.*
4.	Here and there an acicular body ..	*Raphides.*
5.	Portions of woody fibre, fragments of algæ, bits of other vegetable objects, as leaves, flowers, epidermis, and also here and there a solitary vegetable hair, or sporule, or starch grain	*Vegetable matter.*
6.	A few still undissolved remains of the ordinary infusion	*Animal matter.*

No living animal or vegetable forms could be seen.

Indications of traces of chlorine and lime could be obtained by the ordinary re-agents. On the whole I considered that the water examined was not materially or permanently unwholesome, and that it admitted of being easily purified and rendered quite fit for drinking by the mechanical measures usually resorted to for the purpose, such as proper filtration, subsidence and partial diffusion with alum."

The natives' notions of the qualities of the different waters will be best gleaned from the expressive names by which they usually designate them, thus :

" *Sroth jol,* running or stream water; *buddho jol,* stagnant water; *photick jol,* perfectly clear water; *ghola jol,* turbid or muddy water; *moyala jol,* dirty water; *shaph jol,* transparent or apparently clear water; *nona jol,* salt or brackish water; *meettha jol,* sweet, fresh water; *bharee jol,* heavy water or water in which there is much saline impregnation; *halkee jol,* light water; *gobheer jol,* deep water; *solpho jol,* shallow water; *buddh jol,* bad water generally; *bhallow jol,* good water generally; *ghonno jol,* thick water; *patla jol,* thin water; *kadda jol,* extremely muddy or opaque water; *pocha jol,* putrid or decomposing water; *shayala jol,* water in which much weed grows; *paunna jol,* water covered with the floating weed called *paunna ; boda jol,* stagnant water with a peculiar disagreeable styptic taste; *sonda jol,* fœtid water."

In the dry season graves may be eight or nine feet deep, but in the wet weather they may be only four feet. Burials take place generally in the same compound where the deceased lived.

I consider that the people are well fed, and the food on the whole is wholesome. It is always well cooked.

Among the social habits, customs and occupations of the people, the following may be mentioned as more or less prejudicial to health :

Their habitual indolence and inertness as a race, especially in a physical sense, hence the universally confined and sedentary mode of life they lead rather than an active open-air one; their singular listlessness in all that concerns their own bodily well-being; their half-nakedness; their ill-contrived habitations; the generally irregular hours they keep; their sensualities and dissipations; their fasts when they perhaps almost starve, and feasts when they gorge like swine; their superstitiousness, their want of all general and especially of physical education; their early marriages, their proverbial improvidence and carelessness of the morrow; their mourning *shráds* and similar observances; their treatment of the female at child-birth; their fairs, religious bathings, pilgrimages, &c."

SPECIFIC DISEASES.

"The diseases principally met with in the district are, as might be expected, fevers of a malarial or paludal origin, of which the forms most prevalent are the tertian and quotidian agues. Other varieties of the disease, viz., the remittents and common continued are comparatively extremely rare.

Epidemics are rare; although a little cholera occurs annually in a sporadic form nearly all over the district, during the hot dry mouths. Cases of cholerine are also very common about this season.

Dysentery—As an idiopathic affection is seldom met with in the district; I may say the same of *hepatitis.*

Epidemic small-pox is almost unknown."

STATISTICAL RECORD.

"The statement marked D in the Appendix showing the rates of sickness and mortality in the jail for the last ten years may be of some value as a statistical record."

APPENDIX

Statistical record shewing the rates of sickness and mortality

DISEASES.	1858.				1859.				1860.				1861.			
	Admitted.	Discharged.	Died.	Strength.	Admitted.	Discharged.	Died.	Strength.	Admitted.	Discharged.	Died.	Strength.	Admitted.	Discharged.	Died.	Strength.
Febris Quotid. Inter. ...	159	152	2	304·77	241	239	1	392·80	294	293	2	384·12	211	212	1	403·96
Febris, Remittent ...	6	3	3	......	13	13	...	......	7	7	...	......	1	1	...	...
Febris, Continued ...	2	3	...	......	...	...	...	......	2	2	...	......	3	3	...	...
Dysentery	29	28	1	......	4	5	1	......	46	39	7	......	38	30	5	...
Diarrhœa	11	9	...	......	92	88	4	......	45	47	...	......	25	25	...	...
Cholera	28	20	8	......	5	3	2	......	18	15	2	......	13	13	1	...
Hepatitis	...	1	...	......	...	...	...	......	...	...	...	......	...	...	...	...
All other causes ...	352	349	1	......	518	507	8	......	371	358	11	......	239	227	12	...

D.

in the Jail at Furreedpore for 10 *years, from* 1858 *to* 1867.

1862.				1863.				1864.				1865.				1866.				1867.			
Admitted.	Discharged.	Died.	Strength.	Admitted.	Discharged.	Died.	Strength.	Admitted.	Discharged.	Died.	Strength.	Admitted.	Discharged.	Died.	Strength.	Admitted.	Discharged.	Died.	Strength.	Admitted.	Discharged.	Died.	Strength.
233	234	...	432·92	247	244	...	467·69	292	272	...	...	235	233	1	490·97	195	198	...	404·29	183	181	1	406·69
29	27	1	...	33	31	1	..	22	19	1	...	30	30	3	...	19	17	3	...	7	7	...	...
13	11	1	...	5	3	2	...	...	1	...	...	1	1	...	...	...	...	...	...	...	...	...	...
37	34	5	...	29	28	2	...	72	68	2	...	35	34	3	...	35	30	4	...	30	28	3	...
37	37	...	...	45	43	1	...	99	98	...	...	53	53	2	...	34	33	1	...	11	10	...	...
10	7	3	...	2	1	1	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
337	387	7	...	304	287	6	...	318	308	10	...	239	235	6	...	146	142	8	...	139	128	9	...

EPIDEMICS.

"Epidemics as I have already said are rare in the district. In searching through the records in my office for the last twenty five years, I find that, properly speaking, there occurred only one epidemic, viz., of cholera, (and that was in the jail) during the quarter of a century in question. This was in 1858. In 1843 mention is made of a gang of convicts employed on the Dacca road, on the other side of the Pudma, being suddenly overtaken by the disease which carried off a large number of the victims attacked, but the scourge appears to have entirely disappeared, on the survivors having been soon withdrawn into the jail.

In another place I have mentioned that a severe outbreak of cholera visited the small town of Syedpore, on the Barrassia, about nineteen miles to the south-west of the station, soon after the cyclone of last year (1867.)

The disease was attributed to the sudden overcrowding of the town, owing to the arrival there of the late Kamroop Regiment from Gowhatty, conjoined with the extremely inclement weather that prevailed at the time, it having varied incessantly for a few days immediately preceding the outbreak. The district had been previously remarkably healthy. A few cases of cholera I was told had appeared in the Regiment shortly before it left Gowhatty.

It first showed itself in the jail on the 24th October, or about a week or ten days after it had broken out in the Regiment on its arrival.

The Regiment was encamped in *páls* about 300 yards from the jail. The propagation was therefore evidently effected by direct diffusion, by wind, of the poison.

Beyond a few solitary cases in the town the disease did not spread in any direction.

In jail twenty-eight persons were attacked, of whom eight died. In the Regiment I believe about a hundred men were seized, among whom no less than between seventy and eighty succumbed. The women in the Regiment appeared to be less susceptible.

"The poison seemed to be in the air, and to affect chiefly through the local conditions of unhealthiness, which, unfortunately, at the time, obtained —(sudden overcrowding, filth, incessant wet and damp.)

None of the attendants on the sick were attacked.

Contaminated air was the chief cause."

"In the jail everything was done to promote good hygiene, such as thorough cleanliness, ventilation, regulation of food, attention to water-supply, &c.

The outbreak lasted ten days in the jail; it subsided on the 3rd of November.

There are no large fairs held in the district; although small gatherings are not unknown."

VACCINATION AND INOCULATION.

"There is at present no vaccination carried on, as far as the whole district is concerned.

In the Sudder Station it is practised, to some extent, by the Civil Surgeon and the Native Doctors under him.

The following table shows the results for the last two years.—

YEARS.	No. aacci-nated.	No. successful.	No. doubtful.	No. unsuccessful.
1866	313	235	2	76
1867	321	255	3	63
Total in two years.	634	490	5	139

"With few exceptions among the educated classes, the people still show great aversion to the new practice. Inoculation I may say is universal, and so far as my information goes, with few disastrous results. There are a few families who are prohibited to inoculate, either from religious prejudices or immemorial custom."

QUARANTINE, SANITARY POLICE, &c.

"Excepting in the case of small-pox, where we have a tangible enemy to deal with, I consider all quarantine regulations as of doubtful value, if not positively mischievous."

Our natural good health is our best prop, and the only and true friend in this respect.

" What we have really to guard against is not so much personal intercourse as the aerial *fomites* and water, which in nine cases out of ten, are perhaps the sole carriers of disease-poisons, where they may be suspected.

NATIVE PRACTITIONERS.

There are no *hakims,* and only a limited number of *kobirages* to be found in this district. The generality of the class appear to be little better than quacks, and of the latter category, one or two may be found in almost every village of importance. I have not much personal knowledge of them, but I believe their influence is fast on the wane.

"The *Kobirages* profess to practise according to the lights of their *Shastras,* their system being a huge complicated rude humoralism, in which the primary humours, playing a most important part in all diseases, are said to be three, *viz.,* *Bai,* *Pith,* and *Kauph.* *Bai* literally wind, technically nervous essence or power; *Pith,* Bile : and *Kauph* phlegm, by which is meant all other humours, blood, lymph, chyle, &c., singly or together. Their remedies are either cold sedatives, relaxants, depressants and cooling agents generally, and dry astringents, absorbents, &c; or tonics, carminatives, &c., hot stimulants, condiments, &c., and moist diluents, demulcents, water, food, &c. Besides these there are specifics or special correctives of *Bai,* *Pith,* and *Kauph.* There are other modes of classification known.

It would be tedious to enumerate all the individual medicines they use, but it may be generally stated that there is scarcely a mineral or metal which exists in the country which is in some shape or other, not pressed into service, or an indigenous drug of any efficacy that is not resorted to for the purposes of the healing art. Mercury is sparingly used by this class. Metallic tonics especially the oxides of gold, silver and iron are very largely resorted to in chronic ailments. Of course the celebrated *Bish Boree* is used in the low fever. Arsenic and opium, with doses of the *Panchona* (a thick febrifugal purgative tonic infusion of a number of drugs, only so used) is their sheet anchor in all ordinary fevers.

In dysentery and diarrhœa *kootraj,* bark of *Wrightea anti-dysenterica,* *bael sont* (dried pulp of *bael*), mangoe stones, &c., are largely had recourse to.

The quacks, the so-called ordinary village *kobirages,* follow of course no particular system. They use quinine and some few European medicines, (especially of the purgative class) freely, and profuse salivation by the *bhabra* and *battee* (fumigation and smoking) which is evidently their "*dernier resort*" in all forms of chronic disease, excepting spleen. Issues are a very favourite application with these quacks, generally inserted in the middle of one leg or arm, and kept open sometimes for months in all minor and ill-defined ailments."

INDIGENOUS DRUGS.

"I employ these very largely. See list of these drugs in the Appendix E.

Under this head I cannot do better than call earnest attention to my report on the plant *bhant,* which I first submitted to the authorities so long ago as 1860; and in doing so now I trust this valuable drug may yet be thought deserving of more notice than has been hitherto vouchsafed to it, and that means may accordingly be taken for its introduction into general practice all over the country. Its successful use, as a general febrifuge and antiperiodic, in the hospital of Furreedpore, for the last nine years and upwards, is, I think, a sufficient guarantee, that, if prepared and administered with care, it cannot but ensure similar success elsewhere and in other hands.

See also some notes on *haritokee* and *indrojab* which are likewise extensively employed in the hospitals here. (See Appendices, H. and I.)"

It now becomes necessary to notice the paper alluded to on the virtues of *bhant* and *indrojab.* Dr. Bose, in his forwarding letter, writes to me as follows:

"I am vain enough to think that my report on the plant *bhant* and notes on *haritokee* and *indrojab* possess a certain intrinsic interest in a practical and professional sense, especially in India, and as such, perhaps it might be useful, if, with the sanction of Government some measures were taken with a view to these papers being made generally known.

Bhant and *indrojab* with proper management, aided partly by some of the minor indigenous drugs, will unitedly cure three-fourths of the diseases of the country, and those the most fatal and common, more particularly among the rural population."

Dr. Bose's report on the plant called *bhant* consists of 52 pages of manuscript. It is impossible that I could give it place in a purely sanitary report. Indeed the contribution is truly a medical essay, and as such it had perhaps better have been submitted to the Deputy Inspector General of Hospitals. Yet I am loath to pass over altogether a paper of considerable interest, and which has doubtless cost the author of it much research and trouble. Regarding his favourite remedy Dr. Bose writes as follows:

"My present object is to lay before the profession some account of a common plant in Bengal, which appears to me to possess high febrifuge properties, and which may be employed as a weak but a tolerably efficient substitute for the cinchona bark, and its well known alkaloid. In some respects it is even superior and preferable to quinine. As a cheap general tonic I know of no vegetable which can be considered to be equal to it, certainly none will surpass it. Moreover, it will serve as an excellent anthelmintic.*

The plant is usually known as *ghaitu,* or still more commonly as *bhondee* or *bhant.* It grows wild, is to be found in every bush or waste-land in Bengal, and must be readily recognised by the traveller as a most familiar roadside weed. It belongs to the genus *Clerodendron,* of the Natural Order of *Vervenacœ* and has been described, I believe, as *Clerodendron Viscosum.*

The leaves form the most active part of the plant and should be preferred for medicinal purposes. They can be gathered in all seasons of the year; and all that is necessary afterwards is carefully to dry and powder them and preserve for use. The drying is best effected by exposure to sun or by spreading or suspension in a convenient room.

It may be given in the form of infusion or decoction, or in that of powder, tincture or extract. I have hitherto chiefly used it in the form of decoction which is prepared as follows:

Take powdered *bhant* leaves or dry leaves only .. 4 Chittacks or ½ lb.
water .. 16 Ditto.

Coriander seeds a handful.†

Boil down to 8 chittacks and strain; dose from one to six ounces. Intended simply as a tonic, from one to two ounces are sufficient, but when its antiperiodic or febrifuge effect is desired, the dose should usually range from two to four ounces, three or four times daily. To produce a more powerful impression, the decoction may be concentrated by reducing it to six instead of eight chittacks."

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* "The word is here used in the sense of a corrective of a habit or tendency to worms, although as a bitter it will sometimes succeed in expelling them also."

† "I now omit coriander seed altogether. The decoction also sometimes reduced to four chittacks."

THERAPEUTICAL EFFECTS.

"When exhibited internally it acts simply as a most powerful bitter tonic, invigorating the sytem generally, and restoring the functions when impaired to a healthy standard. It seems primarily to exert its influence on the nervous centres whose tone it promotes, and thus indirectly that of other organs. It neither quickens the pulse, augments the animal heat, nor induces any perceptible disturbance of the nervous system, its action, being exclusively and purely that of a genuine bitter tonic. As regards its efficiency as a tonic it may be justly considered at least equal, if not superior to most of the drugs now in use for that purpose, and may be advantageously prescribed for all cases characterised by oppression or defect of the nervous function, or those accompanied with universal atony, such as general debility, anæmia, convalescence from acute diseases, atonic dyspepsia, &c. Its reputation as a tonic vermifuge is proverbial among the natives, who have used it as such from time immemorial.

But the most conspicuous property of *bhant* consists in its undoubted power to arrest an ague as well to cut short fevers of continued and remittent types. In other words *bhant* not only enjoys in a high degree, the virtues of an antiperiodic, but by abating and shortening the duration of continued fevers, it deservedly ranks as a true febrifuge properly so-called.

No less than 250 cases of ague either of the quotidian or tertian form have been treated, since August last on the plan above sketched, and I am happy to say all with complete success.

Bhant is admirably suited to all forms and stages of fever alike, and may be employed with advantage not only as a superior tonic, but as the best and most efficient febrifuge within our reach. As an antiperiodic it ranks perhaps next only to quinine.

The remedy can be obtained for the trouble of collecting it.

As a vehicle for other medicines, for which *chiretta* is now so much resorted to in the form of simple infusion, the new drug should be always preferred."

Dr. Bose, believes that a great saving in money will be effected if *bhant* is substituted in jails and public charitable institutions, for *chiretra* and quinine. With these remarks and extracts, I must leave the profession to put Dr. Bose's suggestions to practical test. The *bhant* grows profusely as a nettle-like weed, around and within almost every village in Bengal. The natives in some places make use of it as an offering to propitiate the goddess of small-pox.

Dr. Bose has also sent me copious notes regarding *haritokee* or simply *hara*, the black Myrabolan of Bengal, which he recommends strongly as an effective purgative, and a decided alternative. He gives 40 to 90 grains of the powder of the dried fruit, or pericarp; and of the unripe fruit from 30 to 60 grains. Lastly Dr. Bose has submitted a lengthy report on *indrojab* or *koorchee*, (*Wrightea Anti-Dysenterica*); the virtues of this remedy are I believe pretty generally known. Dr. Bose believes that its proper administration in cases of cholera "ought to result in at least 80 per cent of recoveries." Most practitioners I fear will entertain doubts on this point.

EPIZOOTICS.

"Diseases among cattle prevailed to some extent in a few villages bordering on the Pubna, Jessore and Burrisaul Districts."

The following table exhibits the nature and extent of the sickness and mortality occasioned, as reported by the Police :—

Police Stations.	No. said to have died.	Cause of death.
Belgachee bordering on Pubna ..	190	40 from the *Puschima* of Dr. McLeod, 150 from *Gootee*.
Bhooshna bordering on Jessore ..	40	All from *Puschima*.
Mureoodpore bordering on Jessore	250	From an affection called *Bard* attended with husky cough and great distress of breathing, probably pleuro-pneumonia.
Sibchur bordering on Burrisaul ..	11	*Gootee*.
Total ..	491	

BURRISAUL.

The following notes have been supplied by Dr. R. G. Mathew.

"The town of Burrisaul is the sudder station of the district and is situated in—

Latitude 22° 30′
Longitude 90° 15′

"*I consider Burrisaul to be generally speaking a healthy place, although capable of much improvement under an active Municipality.*

From what I have been able to gather during the limited period of my residence, I should certainly say that the present sanitary condition of Burrisaul contrasts favorably with its state in former years.

The roads, tanks, &c , were encumbered by jungle, and the native inhabitants, taking advantage of the shelter afforded them, erected privies, and committed nuisances all over the place.

At present the public roads, drains, &c., are kept clean, as far as the very limited municipal fund will allow, and the nuisances have in consequence been much abated.

There has been a marked decrease in the outbreak of cholera and small-pox, and although these diseases do occur at certain periods, they are not so numerous or fatal as they used to be in former years.

Cholera is endemic in the district, and is heard of and seen at all seasons except during the rains.

The prevailing diseases appear to be intermittent fevers, complicated almost invariably with enlargement of the spleen, and frequently terminating in dysentery and diarrhœa. Dyspepsia from eating decomposed fish and fruit, is a very common complaint.

Cholera usually makes its appearance at the commencement of the cold weather, and also at the end of that season, at which times it has a tendency to become epidemic.

Small-pox of late years has not appeared in a virulent form. Diarrhœa and dysentery are not frequently met with as primary affections, but are more frequently seen as sequelæ of intermittent fever, and depend very frequently on hepatic derangements.

Gonorrhœa and syphilis are very common diseases. I have seen a few cases of sloughing chancre in broken down individuals, who had been overdosed with mercury by *kobirages*.

There are no diseases peculiar to the locality; neither leprosy nor elephantiasis appear to be common.

There has been no exceptional sickness during the past year as far as I can learn amongst the general population. The jail, however, has been very unhealthy, 10 per cent of the prisoners perishing."

"Cholera visited the jail three times during the past year, carrying off 19 of the prisoners.

About the months of March and April, cholera generally makes its appearance in the Burrisaul Bazaar. About this time the river is very low and the water in the tanks has become very impure from the long drought, and the filthy habits of the people. It generally lasts up to the commencement of the rains. During the months of September and October fevers are very common.

I consider that the Mahomedan population enjoy better health than the Hindoos, but not to any marked extent.

The people of Backergunge as a rule look remarkably healthy and well-fed. They constitute a thriving population, and are seldom exposed to the devastation of either famine or drought.

As far as I can learn there has been no marked change in the health of the people during the past twelve years; except that epidemics of cholera and small-pox have become less frequent and fatal.

The population of the Backergunge District may be put down at 9,48,835 of which 3,65,710 are Hindoos and 5,89,125 Mahomedans.

I am unable to state to what extent these figures are reliable.

METEOROLOGY, CLIMATE, &C.

Subjoined are the meteorological statistics procurable. They were taken at the Jail Hospital and generally by the Civil Surgeon. There has been nothing peculiar in the climate of the past year.

The climate of Burrisaul is very damp at all seasons of the year. The cold weather sets in about the middle of November, and lasts up to the middle of February; it can never be said to be actually cold, and the bracing feeling experienced in Behar and the Upper-Provinces is never observable. The night air is chilly and raw, and the mornings generally very foggy. During the middle of the day the sun's rays are very powerful.

The cold season is thought very unhealthy by the natives, and numerous cases of sporadic cholera and fever make their appearance at this time of the year."

"The hot weather sets in about the end of February and terminates about the middle of June, when the rains commence. During the hot season frequent storms occur which clear the atmosphere, and render it very pleasant and cool for a few days. The heat at Burrisaul is never very oppressive, and the sea breeze, which generally sets in about sunset, is very refreshing and conducive to health.

The rains in this district are very copious. The whole country seems like a vast swamp, and the growth of vegetation proceeds with wonderful rapidity. The rainy season terminates generally about the middle of September, when the sea breeze lulls, and the air becomes loaded with moisture, and intolerably muggy. From this time until the setting in of the cold weather fevers are prevalent amongst the natives.

Cholera is not usually heard of during the rainy season, and that is the only disease directly influenced by any particular season to a marked extent. All the other diseases prevail to a greater or less extent quite irrespective of the season of the year."

Meteorological Statistics.

MONTHS.	For 1866.							For 1867.							For 1868.						
	TEMPERATURE.					RAINFALL.		TEMPERATURE.					RAINFALL.		TEMPERATURE.					RAINFALL.	
	Highest in the month.	Lowest in the month.	Mean of all the highest.	Mean of all the lowest.	Approximate mean for the month.	Number of days on which rain fell.	Amount collected.	Highest in the month.	Lowest in the month.	Mean of all the highest.	Mean of all the lowest.	Approximate mean for the month.	Number of days on which rain fell.	Amount collected.	Highest in the month.	Lowest in the month.	Mean of all the highest.	Mean of all the lowest.	Approximate mean for the month.	Number of days on which rain fell.	Amount collected.
January	82	58	$74\frac{12}{31}$	$61\frac{21}{31}$	$68\frac{2}{31}$	5	7·1	78	58	$73\frac{11}{31}$	$63\frac{15}{31}$	$68\frac{13}{31}$	2	2·5	76	60	$71\frac{25}{31}$	$64\frac{4}{31}$	$67\frac{30}{31}$	...	...
February	86	58	76	$62\frac{5}{28}$	$69\frac{4}{28}$	3	2·3	84	62	$78\frac{12}{28}$	$62\frac{24}{28}$	$70\frac{4}{28}$	5	3·	84	60	$74\frac{23}{29}$	$67\frac{15}{29}$	$71\frac{14}{29}$	6	4·9
March	92	72	$88\frac{18}{31}$	$77\frac{11}{31}$	$82\frac{16}{31}$	1	·5	90	70	$90\frac{10}{31}$	$74\frac{22}{31}$	$82\frac{1}{31}$	5	3·3	92	66	$85\frac{7}{31}$	$75\frac{1}{31}$	$80\frac{4}{31}$	2	·6
April	92	72	$87\frac{4}{30}$	$77\frac{24}{30}$	$82\frac{14}{30}$	11	10·7	94	76	$88\frac{6}{30}$	$78\frac{28}{30}$	$83\frac{17}{30}$	9	6·5	94	74	90	$79\frac{4}{5}$	$84\frac{9}{10}$	15	18·6
May	96	74	$91\frac{22}{31}$	$80\frac{9}{31}$	$86\frac{3}{31}$	8	4·	94	76	$90\frac{18}{31}$	$81\frac{23}{31}$	$86\frac{5}{31}$	16	6·9	96	74	$90\frac{14}{31}$	$81\frac{14}{31}$	$85\frac{30}{31}$	10	9·
June	96	78	$89\frac{23}{30}$	$80\frac{13}{30}$	$85\frac{5}{30}$	19	19·3	92	78	88°	81°	84°	17	18·1	94	78	88	$81\frac{1}{3}$	$84\frac{2}{3}$	21	38·1
July	88	76	$87\frac{7}{31}$	$80\frac{2}{31}$	$83\frac{5}{31}$	25	26·5	88	78	87·23	80·24	84·8	29	17·9	90	80	$87\frac{19}{31}$	$80\frac{20}{31}$	$84\frac{9}{31}$	23	16·
August	88	78	$85\frac{23}{31}$	$81\frac{5}{31}$	$83\frac{14}{31}$	27	23·	90	78	$88\frac{10}{31}$	$62\frac{10}{31}$	84°	30	23·8	90	78	$87\frac{27}{31}$	$81\frac{1}{31}$	$84\frac{14}{31}$	24	22·7
September	94	80	89	$81\frac{26}{30}$	$85\frac{14}{30}$	16	14·5	92	78	$85\frac{27}{30}$	$83\frac{10}{30}$	$84\frac{15}{30}$	18	16·	92	78	$89\frac{9}{30}$	$81\frac{4}{30}$	$85\frac{6}{30}$	21	16·7
October	90	74	$86\frac{3}{31}$	$79\frac{1}{31}$	$82\frac{2}{31}$	12	11·9	90	74	$86\frac{6}{31}$	$81\frac{17}{31}$	$83\frac{24}{31}$	7	9·7	90	72	$85\frac{11}{31}$	$77\frac{17}{31}$	$81\frac{14}{31}$	3	2·2
November	86	66	$82\frac{10}{30}$	$72\frac{10}{30}$	$77\frac{13}{30}$	...	...	82	66	$78\frac{20}{30}$	$70\frac{20}{30}$	$74\frac{20}{30}$	6	5·6	82	68	$80\frac{9}{30}$	$71\frac{22}{30}$	$75\frac{27}{30}$	...	...
December	78	60	$71\frac{15}{31}$	$60\frac{6}{31}$	$65\frac{12}{31}$	...	...	76	60	66	$64\frac{4}{31}$	$67\frac{20}{31}$	...	...	74	60	$71\frac{1}{31}$	$64\frac{28}{31}$	$67\frac{30}{31}$	...	...

" During the rains the land is entirely under water with the exception of those places artificially raised or bunded.

Water will be found at an average of four feet from the surface.

The Burrisaul River runs close alongside the station in a north and south direction, but the country is intersected in every direction by small tidal creeks in communication with the main stream, so that any great accumulation of stagnant water is impossible, there being a constant ebb and flow.

The country is inundated from July to November, when the river falls and the surface water drains off.

The Burrisaul River is rapidly altering its course, cutting deeply into the bank on the north side of the town, and causing great damage. Mary houses having been abandoned on this account.

On the south side the river is silting up and changing its course and a large and yearly increasing *chur* has been formed.

Were the river not tidal, I fear this *chur* would be a cause of considerable sickness amongst the people resident in its vicinity.

The Backergunge District has always been the store-house from whence the wants of other districts, in times of distress, have been to a large extent supplied.

The ground in the immediate vicinity of the station is open and cultivated, but these cultivated spots are again surrounded by belts of jungle within which the ryots dwell.

A great deal of rank vegetation flourishes around these *barries* which the ryots are unwilling to remove, not only on account of the expense but for the privacy they afford them.

Burrisaul is situated about sinty miles from the estuary of the Ganges, and the country down the river-side to its junction with the sea is, on an average, much higher than the interior.

At Chaplee which is the last land that fronts the Bay, large sand hills are found upon which, during the south-east monsoon, the waves dash with tremendous violence.

The country about Chaplee appears to be healthy, and is principally inhabited by Mughs, among whom I have never heard of any special mortality."

"The water-supply for the inhabitants is principally derived from tanks of which nearly every *ryot* has one on his holding."

SANITATION, CONSERVANCY, &c.

"The general sanitary condition of Burrisaul is very unsatisfactory, there being up to date no Municipal Committee; and the funds at the disposal of the Magistrate for municipal purposes being very limited, he has been hitherto prevented from carrying out any general scheme of sanitation.

Another obstacle is the absence of *domes'* or *mehters'* labour. It has been tried to be imported from Dacca but has always failed.

The only way in which scavenging work can be done is by convict labour, of which the supply is naturally very limited.

The Municipal Act is now about to be introduced into Burrisaul, and the present state of things will no doubt be much ameliorated."

Considerable sanitary improvements have been affected of late years in Burrisaul, in opening up the tidal drains, and communications with the tanks, and the Municipal Superintendent seems to have done his duty in keeping the various roads and tanks under his immediate authority clean and free from jungle.

During the months of March, April and May, the small tanks become very foul, and during these months diarrhœa, dysentery and cholera are rather prevalent.

The natives sometimes become alarmed at the results of their own imprudence, but as the river is at its lowest, nothing can be done until the first high tide fills the tanks in communication with the river, and the ebb removes the putrid water.

The ground in the vicinity of these private tanks is generally covered with human *ejected* and all kinds of filth.

There can be no doubt that a great deal of fœcal matter makes its way into these tanks, and if it were not for the flux and reflux of the tide, I believe there would be a much greater amount of sickness.

A great improvement might be effected by deepening the drains and water-courses about the town, and rebuilding many old culverts which at present only allow over-flow water to pass, and keep out the fresh water from the river."

"Tanks might also be advantageously deepened, and the earth excavated applied to filling up many of the small private puddles, which the owners dignify by the term of "my tank."

Some tanks also ought to be set apart for supplying water for drinking and cooking purposes, and Chowkeedars should be appointed over them to see that no defilement occurs.

The natives do not consider the quality of the water good, and ascribe dyspepsia, dysentery and many forms of skin diseases to its use.

I consider the general supply of water consumed by the natives to be very impure, but that the defect may be easily remedied if the people could be induced to set apart certain tanks for supplying water for drinking and cooking purposes.

When the Municipal Act comes into force it will provide for many of the existing nuisances."

STREETS, &c.

" The streets of the town average about 15 feet in breadth, and are kept clean and in good order under the operations of the Municipal Superintendent."

DRAINS, CESS-PITS, LATRINES, &c.

" The drainage of Burrisaul is carried on by ditches at the sides of the roads.

They average about four feet in depth, and in the rains the tidal water enters freely into them and removes a large quantity of offensive matter.

The drains are kept clean and no remediable obstruction is allowed to remain.

As noticed before many improvements can be effected by the excavation of the tanks and the reconstruction of many culverts which were built many years ago on totally erroneous principles.

There are no public latrines at Burrisaul. The general privy in use at Burrisaul is made of a few bamboos and a plank over a ditch or a hole.

The native women generally surround these privies with a mat to ensure privacy."

"The manure of the cattle is utilized by plastering the walls of the houses, and by burning, to drive away musquitoes and fleas from the cattle at night. Much manure is also used by the residents for their gardens.

Filth is never systematically removed. There is no system of conservancy at work amongst the mass of the population.

I think the interior of the houses are kept very clean, all refuse being removed and thrown outside without any regard to its future removal.

The houses being made of mats there is no deficiency of ventilation, and they are generally lighted only through the door way.

From my own experience I know of no neglect in the disposal of human remains, a body is sometimes seen in the river as the result of a boat accident, but as a rule corpses are not thrown into the river.

The principal nuisance at Burrisaul connected with trade or manufacture is caused by a colony of *chumars* whose houses are close to the main road and very near the *cutcherries.*

"These people are very troublesome from the nuisance they cause in preparing hides; and from the limited area occupied by them it requires constant supervision to prevent them from converting the public road into a tanyard.

The removal of these *chumars* to the outskirts of the town would be a very important sanitary improvement.

The people cannot be said to be cleanly in their habits. They wash in the filthy pools they call tanks, and use the same water for drinking and culinary purposes. The interior of the houses may be kept clean, but outside the ground is generally in a very dirty state, covered with all the refuse of the houses, which once thrown down is never removed except under coercion.

I have frequently seen decomposed fish exposed for sale in the public market, and have drawn the attention of the Magistrate to the matter. One or two parties were fined for selling decomposed fish, and the practice has since been discontinued.

I think the food is both various and abundant, but the lower classes are found to eat rotten fish and fruit on account of its cheapness, the bad taste and smell being partially disguised by the spices used in their curries."

"*Occasionally they indulge in large quantities of indigestible sweetmeats at their feasts and festivals, and then diarrhœa, and at certain seasons of the year,* cholera ensues from such imprudence. During the Mahomedan fast, cases of indigestion with cholera symptoms are of frequent occurrence amongst the Mussulman community, from the fact of their taking food only once in the twenty-four hours, when more is taken than can be properly digested.

Remittent fever—Is not a common disease as far as I can learn even amongst the jail population; I have not seen many cases, and the few I saw were of a very mild type.

Cholera—Is endemic in this district. It is seen and heard of at every season of the year with the exception of the rains.

It is most common in the beginning and end of the cold weather at which season it has a tendency to become epidemic.

The cases I saw at the commencement of the past cold weather were of a very severe type. Many proving fatal within twenty-four hours from the time of attack.

Cholera occurs regularly in Burrisaul at the commencement and end of the cold weather, but no records have been kept regarding it hitherto.

The people of the district have the greatest horror of the disease, and seem fully to understand the usefulness of applying for relief in its early stages.

They have no faith in *Kobirages* when cholera is in question, and the people apply freely to the charitable dispensary for medicine.

Diarrhœa—Is as might be expected a very common affection. Eating decomposing fish, particularly the *hilsa*, seems to be the most common cause of this disease. It is usually accompanied by severe dyspepsia with flatulent distension of the bowels and stomach, causing considerable pain and distress. The people believe that this disease is caused by bad water, and certainly the water procurable in the Burrisaul tanks during the hot weather months is bad enough to cause any disease of the description; but the popular belief admits of doubt, inasmuch, as the prisoners also suffer much from the disease, and they are never allowed to use any water that is not quite pure and carefully filtered.

Dysentery—Although a very common and fatal disease amongst the prisoners, does not prevail to any marked extent amongst the free population."

There is nothing peculiar about the dysentery of this district, but I have not seen the same favorable results follow the use of ipecacuanha in this district that I have seen in other places. Quinine has been found most useful in checking this disease.

Small-pox —I have never seen a case of this disease in this district, and from what I can learn it does not seem to have been either prevalent or virulent during the past six years.

Hepatitis —Is not a very common disease; I have never seen a case of acute hepatitis in Backergunge. Enlargement of the liver, the result of fever, is common."

EPIDEMICS.

" As mentioned in previous paragraphs of this report, no serious epidemics of cholera have taken place during the last five years, nor indeed of any other disease. No records of the past epidemics of this district have been kept.

At one time the jail population suffered much from this disease, but since the dry-earth system has been introduced, no virulent epidemics of it have occurred amongst the prisoners.

That cholera is endemic in the district there can be no doubt, and mild epidemics are apt to occur at the beginning and end of the cold weather.

It has always been noticed that during the time the disease is prevalent, the sky is generally overcast, and the atmosphere presents a peculiar hazy appearance.

I witnessed a mild epidemic of cholera in Burrisaul at the commencement of the past cold weather. The disease was not confined to any particular locality. I saw cases in every quarter of the town, and the disease was almost entirely confined to the lower orders of the people.

The jail population suffered slightly at the same time. The disease in this case was supposed to have originated at the Laucutea Fair, and some of the people whom I saw suffering from the disease had been to the fair, from which they had fled panic-stricken.

For the first few days the disease was of a most severe type, and not in the least benefited by the mode of treatment adopted; but it did not spread to any great extent, and in the course of twelve days disappeared in an epidemic form, but sptoradic cases continued to occur all throughout the cold season."

" Whilst the disease was prevalent in the bazaar a compounder, was sent from house to house with astringent medicines, and all cases of diarrhœa received immediate attention; when the disease was fully developed the cases were sent to the hospital for treatment.

Means were taken to remove nuisances when possible, and parties whose houses, tanks, &c., were in a foul state received orders from the Magistrate to have them cleaned without delay."

FAIRS.

" Fairs are held every year within the district at eight different places,viz :

1*st.* Kalasharee. This fair takes place early in November every year, and about 12,000 people are supposed to be present.

2*nd.* Kulshopkali Fair is held also during the month of November, and about 8,000 people attend it.

3*rd.* Laucutea Fair takes place in the month of November, about 10,000 people are present ; Laucutea is only about four miles from Burrisaul, and was the scene last year of an outbreak of cholera.

4*th.* Bounripore. This is also a November fair, and about 4,000 are generally present.

5*th.* Nulchna Fair is held in December, and about 3,000 people are said to attend it.

6*th.* Perozepore Fair is held every year in the month of March, and is generally very largely attended; I cannot state with any thing like certainty the number of people generally present.

7*th.* Bundana Fair is held in the month of April, and about 4,000 people are present.

8*th.* Jhalokatee Fair is held every year in the month of April and is attended by 8,000 people.

These fairs are held, with few exceptions, at the most unhealthy seasons of the year, and no attempt at anything like a sanitary precaution is ever made, but there is no evidence to prove that they are followed by any great outbreaks of disease. True it is that at Laucutea last year cholera did occur, but it is not at all an usual occurrence as far as I can learn.

The people of this district have such a horror of cholera, that, a report of the disease having made its appearance, would disperse the largest assembly in the course of a few hours."

VACCINATION, INOCULATION.

"Vaccination appears to have been first practised in Burrisaul in 1865. I am not aware of any attempt being made to introduce it generally into the district. The vaccinator attached to the dispensary is active and intelligent, and I think the figures in the subjoined table may be relied on.

YEAR.	Total vaccinated.	Successful.	Unsuccessful.	Doubtful.	Total.	Subject to Bryce's test.
1865 ...	227	96	83	44	223	4
1866 ...	582	432	124	26	582	...
1867 ...	711	482	266	23	711	...
1868 ...	1,024	732	199	93	1,024	...
Total...	2,544	1,742	612	186	2,540	4

I cannot state with anything like accuracy to what extent inoculation has been practised: but it is the opinion of many of the old residents, both European and Native, that it does not find so much favor with the people as it used to do in former years.

Vaccination is carried on by means of one vaccinator attached to the charitable dispensary. As far as I can judge the people have no prejudice against vaccination that could not be overcome by a little tact; they do not seem to be very partial to inoculation.

There is one sect of Mahomedans, *Ferazees,* who are very prejudiced against vaccination; extremely ignorant and bigotted, this sect opposes vaccination in every way possible.

I am confident that little difficulty would be felt in establishing vaccination amongst the Hindoo community of this district, and that a great majority of the people are fully alive to the dangers of inoculation, and as a rule they are slow to resort to it except when small-pox is present amongst them."

QUARANTINE.

"It would be most difficult to carry out an efficient system of quarantine for this district, nor do I think it would be attended with any marked result as regards the health of the people.

" Intemperance is common amongst the lower classes of the inhabitants of the town, such as the *chumars, dhobees,* and *mehters;* of late years the consumption of all kinds of European wines and spirits has very much increased.

The Mughs in the southern parts of the district are notorious for their consumption of spirits.

They are so accustomed to the use of spirits, that a large quantity of liquor can be consumed by these people without intoxication being caused.

The common bazar spirit and rum, used by the lower classes is very bad, but the percentage of alcohol is low."

NATIVE PRACTITIONERS.

" There are supposed to be 250 *kobirages* in the Backergunge District. I can say little about them from personal knowledge, I do not think their influence amongst the people is increasing, and few men of respectability belong to their body."

EPIZOOTICS.

" In the year 1865 about the month of August, a violent epidemic occurred amongst the cattle of this district. It is to be regretted that no record regarding it can be found, although I believe a report on the subject was drawn up by Dr. Bensley, who was then in medical charge of this station.

As far as I can learn, the disease set in with febrile symptoms, and on the fourth day violent diarrhœa, usually serous, but sometimes bloody, made its appearance.

This diarrhœa rapidly exhausted the powers of life; a low form of pneumonia is also said to have complicated the disease."

9.—DACCA.

Notes by DR. J. F. WISE, *Civil Surgeon of Dacca, on the sanitary state of that Station.*

"Owing to bad health, I am unable to forward such a detailed sanitary report as I should have liked. The information now thrown together is from the material collected during the last six months for a comprehensive report. On most of the points referred to in the series of questions I have already written in my reports for the years 1866 and 1867. As was stated in them, I am of opinion that the city and district of Dacca are deteriorating in healthiness. I think there can be no doubt of this. As regards the city no scavenging can be said to be carried on. The night soil lies where it falls, and is washed into the river by the periodic rains. As no steps are taken to remove the filth from the city, it is year by year accumulating in the midst of the people, and poisoning the atmosphere on all sides. The water of the wells from which hundreds of the people drink, are horribly polluted. The water is insipid. It contains nitrites in abundance, and the amount of organic matter varies from six grains in the best wells to thirteen grains in the worst. Fevers, of a low asthenic type and remittent in character, are very prevalent in the city at all seasons, especially in those quarters where there is a total disregard of cleanliness. In some respects they are peculiar. There is a tendency to catarrhal diarrhœa of the most offensive odour, attended with much tenesmus; the accessions are not well marked; the forehead is hot; the extremities cold; the pulse ranges from 80 to 95. There is generally congestion and torpidity of the liver. Quinine is of little effect in checking the accessions. In dirty native houses, these fevers generally last for ten days or a fortnight, and are followed by great anæmia. These fevers are frequently complicated, especially in the cold season, with pneumonia or pleurisy. The people of Dacca die in large numbers from these complications. Enlargement of the spleen, diarrhœa and dysentery are very common. Atonic dyspepsia, the result of malarious poisoning is very general, and followed as it frequently is by poverty of blood, internal congestions and dropsical effusions, it becomes a very serious disease among natives. Abscess of the liver is far from being uncommon. In short, all the diseases which are most frequent among the native community are the consequences of bad food, foul air, and impure water. They are insidious in their first appearance, chronic in their duration and very intractable unless the patient is removed to a purer atmosphere, and supplied with better food than he is accustomed to.

Health of District.

Like the city, the district of Dacca has been becoming more and more unhealthy. This is to be expected, when the habits of the people are considered. The old villages are becoming buried beneath the heaps of accumulated filth that have been gradually increasing for ages. No attempts to get rid of such filth are ever made. The favorite site for latrines is the bank of tanks; dead bodies, too, are generally buried there. The condition of the water in these holes must be most nauseous. Vegetation also is permitted to grow up unchecked, until the perflation of air is completely obstructed. There are hundreds of villages throughout this district which are in the unwholesome state above described."

"There are other causes, however, more general in their effects, which have rendered whole tracts of country unhealthy. Chief among these is the closure or silting up of rivers, which used to wind through populous districts, and supplied the people with comparatively pure water. These rivers or *khals* are even now flooded in the rains, but as the inundation subsides, stagnant pools which soon become covered with slimy weeds, are the sole indication of the former stream. The tanks which were constructed years ago have also silted up, and become no better than marshes. The water is impregnated with the products of decaying vegetation, and is quite unfit for human consumption. No zemindar now-a-days ever excavates a tank, and wells cannot be thought of.

Such being a true and unvarnished, though far from finished description of the sanitary state of this district, it cannot be wondered at that sickness prevails. Last September I visited a dispensary in the south of Bickrampore. For thirty miles, my boat traversed a country covered with from three to eight feet of water. The villages alone stood out and exhibited small patches of dry land. Yet, even in them, the communication with the next house required a boat. These facts are mentioned to show that it is beyond human power to make a country healthy under such conditions. When that expanse of water drains off, as the rivers fall in October, a marsh, co-extensive with the alluvial plains of Bengal, is formed. The water left behind in holes and hollows becomes of a dark brown color. The exhalations from this drying up marsh are offensive, malaria abounds, and fevers of a severe type overrun the villages. It is at this season that sanitary knowledge put in practice will do incalculable good. Water fit for consumption is not procurable, and the people are compelled to drink what they denounce. If good pure water could be supplied to these villages, the natives would soon find out its value and use it. Norton's tube-wells promise to do a great deal of good in this direction, and if they can be sunk cheaply they will remove the greatest difficulty in improving the healthiness of the villlages in Eastern Bengal.

Good water is the most pressing want of the present day in Bengal. If by any cheap means it can be supplied to every large village, the health of the people would be greatly benefited. The other objectionable customs, such as burying the dead in the midst of the living, the allowing trees and jungle to grow up unchecked, and the unnatural and disgusting practice of placing their latrines in close proximity to their houses and tanks, could be easily put a stop to.

The banks of all rivers subject to inundation are higher than the country inland. The slope of the land in the Dacca District is away from the rivers, and the lowest part of the country is the point equi-distant from the two rivers, where they run parallel to one another. The villages therefore on the banks of rivers are the most healthy; those farthest inland the most unhealthy. This is a general rule, to which, however, there are certain exceptions. For example, when a river and its feeders are silting up, the villages on the banks of the *khals*, even though built near their mouths, become unhealthy, and if old and buried in jungle, the inhabitants become victims to fever and spleen. New villages on the banks of rivers are always remarkably healthy, and the inhabitants are most prolific. It is in old villages that the puny, large-bellied children are met with.

I have for many years been of opinion that the population of Eastern Bengal is decreasing. There are no statistics to go by; but from enquiries made among the people I have satisfied myself that the population of all old villages, (and these form the majority) is diminishing. On the other hand, wherever a new village is planted, population rapidly increases. In several former reports I have collected the mortality lists of certain old villages in this district. True, the residents were dying from temporary and exceptional causes, but it is these very causes, fever and spleen, which are desolating, one after the other, the villages of Bengal. In these lists the mortality ranged from 19 to 27 per cent per annum, a fearful mortality for an agricultural population. In endeavouring to come to some conclusion on such an important subject as this, the mortality among children must be considered ; I think, if we take 20 per cent as the number of children who die before they arrive at three years of age, the estimate will not be pronounced excessive. With all these facts before us, it is difficult to arrive at any other conclusion, than that the people are dying faster than they increase.

I allow, and am glad that I can do so, that the lower castes of natives, such as fishermen, *moochies*, *boonooas*, &c., are very prolific, and are rapidly increasing in numbers, wherever they are settled. They live better than the higher castes of Hindoos or the Mahomedans ; their occupation is out of doors ; they resist malaria better than the other races, and their villages are generally more open, and with less vegetation than those belonging to the other classes.

Emigration from this district is exceedingly rare. Immigration is carried out to a small extent. The Zemindar of Bhowal has of late years been inducing natives of Tipperah to settle and clear the jungle on his property. *Boonooah* immigrants come in small numbers and settle around the different Indigo Factories in this district. A small advance of money is given them to build their mat house, and a *beegah* of land free of rent as inducements to remain."

"There can be no doubt that intemperance is spreading, especially among Hindoos. In cities, where they are procurable, brandy and port wine are preferred by the rising generation; but among the lower classes, Government spirit or spirit made from rice, is chiefly drunk. Mahomedans are addicted to opium eating, and in Dacca all adults of above forty years of age, become slaves to this drug. They excuse themselves by saying that it wards off cholera, dysentery and diabetes. Mahomedan mothers almost invariably give infants, from the fortieth day after birth until they are three years old, a small quantity of opium daily. It is said to prevent diarrhœa and the convulsive diseases so common among native children."

CREMATION AND INTERMENT OF THE DEAD.

"There are two places outside the city, where the Hindoo dead are buried. One is on the north-west, the other on the south- east of the town. The high price of firewood and the monopoly enjoyed by the *domes*, who construct the funeral pyre, prevent the bodies being carefully burned. As a rule, throughout the district, corpses are only partially consumed, and in this condition they are cast into the nearest *bheel*, pool of water, or river. The bodies of the poorer classes are treated in a still more disgusting manner; the lips of the dead person are touched with a burning piece of wood, the body is then sunk in a river or other water-course, by means of water jars, tied round the neck, a bamboo stake is then driven through the belly into the bed of the stream; where the banks are high, the place selected is some *ghât* at which the people bathe and procure drinking water. No compunction at drinking fluid contaminated in this way is felt, and no complaint is ever made to the Officials.

The Mahomedans in Dacca use every vacant piece of land in the city as a burial ground. The banks of tanks are a very favourite resting place; and in the midst of the most densely inhabited quarters, within a few feet of dwelling houses, the dead are buried. In Dacca, which has no place seven feet above the periodical inundations, it is impossible to dig a grave six feet deep during the rains, and in the low-lying places, water is reached about four feet beneath the surface. The graves excavated for the reception of the Mahomedan dead, are often therefore less than four feet beneath the surface. I believe this disgusting practice of burying the dead in the midst of the living is opposed to the feelings of the race, who are remarkably superstitious regarding grave-yards and the spirits which haunt them after night-fall. It owes its origin to the absence of any public cemetery, and to the fees which were levied by the owners of land appropriated for this purpose. It can only be stopped by the closure of all private intramural grave-yards, and by the opening of public cemeteries at convenient distances from the city."

SLAUGHTER OF ANIMALS.

"The only place where the butchers, (*kasais,*) slaughter animals, is in the "old lines," half a mile beyond the northern limit of the city. It is on the edge of the jungle, and remote from habitations. The offal is thrown into the jungle, where it is quickly devoured by jackals, vultures, adjutants and dogs. The internal fat is purified by the butchers and sold to the soap-boilers; the hides are purchased by the *chumars,* and the caul is used in the construction of the native drum, (*dug-dugi.*)

OBNOXIOUS TRADES.

In Dacca there are no manufactories which can be called objectionable. The bazaar inhabited by the shell-cutters, *Sakrie Bazaar,* becomes at times very offensive, owing to the putrid mollusca, which are extracted from the shells, on their first arrival. Until lately brick-kilns were regularly constructed alongside the *nullah* which runs through the town. The great breadth which this creek has attained in certain places, is due to the large quantities of clay for bricks which have for years been excavated from its bed and banks.

This trade is less frequently carried on in the midst of the city than formerly. The brick-fields have been transferred to the outskirts of the city. In the places now worked, there is little injury done to any one, as they are remote from all habitations.

The steeping of *jute* is not much practised in Dacca itself; but in the neighbourhood, and in the north-western and eastern Pergunnahs, the preparation of *jute* is one of the most lucrative trades in the district. The cultivators require stagnant pools for steeping the plant, and they are not particular where they go to; the village or domestic tank, the nearest *bheel* or backwater are all indiscriminately used. The offensive smell arising from this process must render the water undrinkable and nauseous. Yet, I believe, the native drinks it without disgust. The steeping of *jute* is always carried on during the height of the rains. The heavy rain-fall doubtless lessens the unwholesomeness of the water. Fever is, however, very prevalent in villages where *jute* is being steeped. There is a general belief among natives that bales of newly prepared *jute* are injurious to health, and that breathing the air near it causes fever. I have not been able to verify this by personal observation or by reliable testimony. The preparation of hides is carried on extensively in Dacca. In the centre of the city one of the largest manufactories in the district exists. The *chumars* prepare the hides and parties of them travel about the country buying them up and bringing them for sale to the traders of Dacca. The *chumars* clean the hides on the banks of tanks or water-courses. The fatty matters rubbed off the skins are allowed to flow into the water. The liquid used in tanning also flows back into the water."

CHOLERA AND ITS OUTBREAKS IN DACCA.

"Cholera appeared in an epidemic form for the first time in the Dacca District in July 1817, at Sonargong, on the old Brahmapootra, and to the east of Dacca; from thence it was transported by human intercourse to all the neighbouring markets. After visiting Naraingunge, the disease spread to Dacca. Its appearance in the city was in the beginning of August. The epidemic was more fatal in the mofussil villages, than in the city. In the former, 59 per cent of the seizures terminated fatally, in the latter only 6·6 during the first year, and 8·9 per cent during the second. At the beginning the disease was most fatal; and males were liable to attacks in a double proportion to females. The treatment followed by six Native Doctors, who were stationed in various parts of the city under the direction of Dr. Todd the Civil Surgeon, "was equally satisfactory. Out of 1,051 persons attacked, 69 only died."

Between 1817 and 1830, no accommodation was provided for in-patients in the native hospital. This prevents our ascertaining the rate of mortality of the disease at the period. In 1819 the disease was very prevalent in the city, 330 out-patients being treated at the hospital. During the next three years the disease gradually disappeared, and in 1822 only four cases were admitted. Between 1822 and 1826, the disease was again on the increase; in the latter year 420 patients were treated. In 1825 Dr. Taylor remarks that 427 persons died of the disease in the city. Unfortunately, the returns give no details regarding the disease, and it is impossible to find out at what seasons it was most general or what was the rate of mortality. During the next nine years, cholera decreased, and from January to June 1834, no case was treated in the hospital. The following table shows the quarterly admissions during five years at this period :—

	January to March.	*April to June.*	*July to September.*	*October to December.*
1834	"	"	78	31
1835	57	3	134	129
1836	103	168	63	98
1837	48	32	42	27
1838	37	50	36	54
Totals ...	245	253	353	339

The most remarkable point about this table is the greater frequency of the disease during the rainy months, from July to September, than during the other quarters. It has already been noted that August was the month in which the disease first appeared in Dacca. During the last quarter of a century, cholera has always been at a minimum during the rains, and most prevalent in the hot dry months. According to Dr. Taylor, in the regimental hospital at Dacca, only twenty-eight cases were admitted from cholera between 1828 and 1837; of these eleven died. The largest number of admissions were in April and May; then in October and November. This nearly agrees with the experience of later years.

Dr. Taylor, in his Topography of Dacca, published in 1839, states that "of late years the visitations of cholera have been less frequent, and in most instances the disease has been of a somewhat milder character than formerly." The records of the various hospitals do not confirm this statement, as they show during 1835 and 1836 nearly three times as many cholera cases as in the years before and after them

Between 1830 and 1838, the mortality in the native hospital in Dacca was at the rate of 48 per cent; while, as shown above, in the regimental hospital, between 1828 and 1837 it was only 39·3 per cent.

Taking the decade from 1840 to 1849, it appears that cholera was most prevalent during 1842 and 1845; but in all the other years it broke out with more or less severity. In 1842 the epidemic sprung up in April and lasted till the rains. Those attacked died in collapse after a few hours' illness. In 1845, the disease was very general during the first six months. In February it broke out with great virulence in the city and spread until the rains. Forty prisoners were attacked and twenty-eight died, out of an average strength of 991. In the Lunatic Asylum nineteen persons were attacked, of whom fourteen died.

During these ten years, of 132 prisoners admitted into the jail hospital with cholera, 71 or 53·7 died. Of 187 in-patients in the native hospitals, 124 or 66·3 per cent died. In the Lunatic Asylum, between 1842 and 1849, of 102 cases 66 died or 64·7 per cent. Between 1850 and 1859, the years 1851, 52, 53 and 55 in the city; 1852, 55, 56 and 58 in the Jail; 1851, 53, 55 and 57 in the Asylum were the most sickly.

In November and December 1851 cholera was "destroying hundreds in the city." The first half of the year was remarkably free from the disease; a similar anomaly occurred in the following year 1852, when cholera became very common and very fatal in the suburbs during October and November.

During 1853, two outbreaks of cholera are recorded. The first continued from April to July and "increased in severity of type and mortality." The second began in the middle of November; the natives attributed its appearance to the annual fair, which is held at that date, near Moonsheegunge. The disease spread into different parts of the district and proved very fatal. In the asylum, eighteen lunatics were attacked, of whom nine died; in the jail twelve prisoners were attacked, but only three died."

"The outbreak of 1855 began at the end of February and terminated in the second week of April. "The cessation was brought about," Dr. Green wrote, "by several hail-storms and heavy falls of rain occurring at the end of March and in the early part of April." During the rains the disease again appeared, and in August and September it was very fatal. Over 5 per cent of the prisoners and 21 per cent of the lunatics were attacked this year with cholera.

Since 1845, no such sickly season had occurred; December 1855, and January 1856 were healthy, but at the end of February of the latter year, the disease appeared in a mild form, and lingered through March and April. In October 1856, the disease was characterised by "deep and fatal collapse following closely upon a few watery stools." This year thirty-eight prisoners were attacked and sixteen died. In the Asylum only five cases were treated. The year 1857 was healthy. In the Asylum, however twenty-one cases were admitted from a mean strength of 183 inmates, but only eight died. Between 1850 and 1859, the admissions and deaths were as follows:—

Native and Mitford Hospital in-patients,	admitted 287;	died 183	per cent	63·7
Jail	174;	55	"	31·6
Lunatic Asylum	185;	84	"	45·4

From the year 1860 up to the present date, the records are complete, but few references are to be found regarding the rise, progress and mortality of the various outbreaks of cholera. It is only within the last two years that information on these several points has been sought for. On this account it is difficult to disprove the many theories regarding the causes of cholera in Dacca, which are popular among the residents in the city.

During March and April 1860, cholera prevailed epidemically in the city and the jail. The type was severe; death occurring in the stage of collapse. Throughout this year the disease was met with in the city. One-third of the out-patients from it were admitted during the rainy months. Mortality among the in-patients of the Mitford Hospital during the year was 77 per cent, among the prisoners in the jail 60 per cent.

In 1861, cholera was much less general than in the previous year, and also less fatal. In November and December the largest number of cases occurred; but in August and September the disease was common. The mortality in the Mitford Hospital fell this year to 59·4 per cent; in the jail to 31·5 per cent; in the Asylum to 18 per cent.

An outbreak of cholera appeared at the beginning of the hot and cold seasons of 1862. It was mild, and the deaths in the city and district were few; the records of the Mitford Hospital, however, show that from March to September the disease was rife, and that those admitted died at the rate of 70 per cent. It is no safe criterion of the virulence of any outbreaks to take the statistics derived from a public hospital, especially in India. The people are so apathetic and so averse to seek medical aid at the first onset of the disease, that a large majority of the patients are brought to hospital after many hours illness, and often when in a moribund state. The register of the jail exhibits a mortality during the above period of only 18 per cent. In 1863 cholera was general during the whole year. It reached its maximum of intensity in March, then gradually diminished till September, when it again broke out. At the Mitford 444 cases were treated, and out of fifty-nine admissions, thirty died, equal to 50 per cent. There was nothing unusual in the type of the disease, and it was reported that cholera was less prevalent than usual in the district. The small European community in Dacca lost seven of their number this year from cholera. Three died in March; two in June. During the months of January and February, and again in November, cholera prevailed epidemically. The disease was not fatal among natives. In the jail there was only one death in six cases; in the Asylum two out of three cases terminated fatally. Three European Officers died this year of the disease. In the Mitford the mortality averaged 55 per cent.

In 1865, cholera was unusually infrequent; July, October and November were the most unhealthy months in the city. The Asylum suffered severely this year; over 5 per cent of the lunatics were attacked, and of thirteen cases eight died. In the Mitford Hospital of sixty-six admissions thirty-four died or 51·5 per cent. In 1866, cholera was exceedingly prevalent in the city during November and December. The type, however, was a mild one, and the mortality not severe. In my sanitary report of the district for that year, which was forwarded to the Sanitary Commission, full details of the various outbreaks of the disease in the *pergunnahs* of this division will be found. In several parts of the district the disease was very virulent and many died. In the Mitford Hospital, of thirty admissions only thirteen died or 43 per cent; in the jail of seven admissions, five died or 71 per cent; in the Asylum of eight admissions seven died or 87·5 per cent.

During 1867, cholera did not appear in an epidemic form in the city. In the Jail not a single case occurred. A similar immunity had not happened during thirty-one years. In the Mitford Hospital, of ten admissions seven or 70 per cent died; only one case was met with in the Asylum, which ended fatally.

During the last week of 1867 cholera appeared in Dacca. It gradually spread throughout the city, and by the second week of January it became very general and very fatal. One peculiarity was observed; its ravages were much more severe in the *mohullas* bordering upon the river, and its course could be traced day by day as it advanced in a north-west direction. In a report which was published in the *Calcutta Gazette*, the detailed particulars are given of this outbreak. At the same time, or shortly afterwards, the disease spread through the *Pergunnahs* on the west of Dacca, and many died. Up to the periodic rains, the disease existed in one or other parts of the district. In July cholera was prevalent in the northern parts of the city. During September and the 1st half of October no cases occurred; but on the 26th October one of the lunatics in the Asylum was attacked; about the same time several persons died in Meerpore, a large village on the north-west of Dacca; in the Manickgunge District the disease appeared almost at the same time. In the city itself, the first cases met with were on or about the 1st November. I have been particular in noting these facts, as they disprove one of the most popular and time-honoured convictions of the residents of Dacca,—namely that the cholera, which annually appears in the city towards the end of the year, is introduced from the *Baronee Mela* which is held at Moonsheegunge in the month of November. In 1868, this fair was opened on the 31st October, it lasted until the middle of December, during these six weeks only thirteen cases with six deaths were admitted into the hospital at the fair. A great many persons, and this always happens, were taken ill on their way back from the *mēla* and died in Dacca. This liability to be attacked is probably due to the exposure and fatigue undergone on the journey to and from Moonsheegunge.

There is one peculiarity about the endemic cholera of Dacca, that only on rare occasions does it spread among the members of a household. During 1868, these exceptional cases were more frequent than usual. In the village of Goran on the 1st February, I saw six members of one family in the collapse of cholera at the same time; in another house three. Early in August, four people were attacked in one house in Dacca; in a second instance in another part of the town, four were also attacked and two died.

My experience during the two past years has, however, taught me that the cholera peculiar to Dacca is not spread by contagion. One school boy, living with twenty others in a room which ought to contain only ten, is attacked with cholera, no disinfectants are used and no measures of cleanliness are enforced, yet the disease never spreads to any of the other inmates. It is the general impression among the natives that it is not communicable from man to man. I agree in this opinion, but I farther believe that under certain special circumstances when the poison is concentrated, it is spread by human intercourse."

"The following peculiarities regarding cholera are deducible from the records of the various hospitals:

1st. Since cholera first appeared in an epidemic form in Dacca in August 1817, the disease has not failed to appear in the city during each year up to 1868.

2nd. April, November, December and March are, in the order named, the most sickly months in the year. In Calcutta cholera is most prevalent in April, March, May, February and then November.

3rd. Among the lunatics in the Asylum, the sickly months are November December, October and January, and of the deaths 20 per cent takes place in those months.

4th. Among the European residents, twenty-six deaths have been registered during the last thirteen years; of these seven died in November, six in April, four in March, three in October and two respectively in the months of June, August and December.

5th. Late rains, and a slow subsidence of the inundations postpone the outburst of cholera; an early cessation of the rains is followed by an early outbreak of cholera. In 1867, heavy rain fell in the middle of November; cholera did not break out till the end of December. In 1868 the rains ceased by the 10th October; cholera appeared in various parts of the district, and in Dacca about the 26th of October.

6th. Cholera is most prevalent, at those seasons, when there is the greatest range of temperature, as in April and November, and there appears to be a close connection between the attacks and exposure to chills, especially at night."

SMALL-POX.

" Small-pox generally breaks out in this district during the months of March and April. It has rarely appeared in an epidemic form, although inoculation is practised in every village. Between 70 and 80 per cent of the people are protected and as safe from small-pox as human means can make them. It is to the unusual practice of inoculation that I refer the immunity from this loathsome disease.

The records in my possession, give little insight into the prevalence of small-pox in former years. The following information on this subject has, however, been collected:

In 1827, the Dacca Provisional Battalion had fourteen cases among an average of 1,270 men."

Between 1828 and 1837 a detachment of Artillery and a Native Regiment stationed at Dacca, had thirteen admissions from small-pox, only one terminated fatally. Since 1843 the Lunatic Asylum has been visited by small-pox on four occasions; in 1843, 1846, 1850 and 1864. In these years there were forty seizures and eleven deaths (27·5 per cent.) In the jail, during the same period, the disease appeared in 1843, '45, '49, '50, '53, '61, '63, '64, and '67. There were sixteen deaths among sixty-nine cases (23·1 per cent.) The years and 1864 were the most sickly. The former was the season in which the most virulent and wide-spread outbreak of small-pox probably ever known in Bengal ravaged the country. The epidemic began in March, was at its height in April and gradually died out in May. In the Jail 3·5 of the average strength were attacked, and the mortality was at the rate of 35 per cent.

In the Asylum, 9 per cent of the inmates were attacked, and 40 per cent of those attacked died. The epidemic of 1864 was neither so general nor so fatal as that of 1850. In the jail 2·6 per cent of the prisoners were attacked, and the mortality was at the rate of 30·7 per cent. In the Asylum eight died out of an average of 230 inmates.

During the last ten years, forty-two cases of small-pox have been admitted into the Mitford Hospital, namely five in 1861; four in 1863; and thirty-two in 1864; of these forty-two cases 24 or 57 per cent terminated fatally.

Statement showing the admissions and deaths from cholera in the Mitford Hospital during the ten years from 1859 *to* 1868.

YEARS.	Jany.		Feby.		March.		April.		May.		June.		July.		August.		Sept.		Oct.		Novr.		Decr.		Total Admissions.	Total Deaths.	Per centage of deaths to admissions.	Out-door.
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.				
1859	...	...	...	...	...	...	6	1	...	...	3	3	...	...	...	...	...	...	1	...	9	8	6	5	25	17	68	96
1860	4	4	1	1	1	1	4	2	3	3	10	8	...	...	1	...	8	5	2	2	2	2	4	3	40	31	77	97
1861	...	...	1	...	...	...	3	...	5	2	3	1	...	...	...	...	5	4	2	1	8	7	10	7	37	22	59·4	89
1862	...	...	...	...	8	7	3	2	5	4	5	2	...	...	...	...	...	...	...	...	1	1	2	1	24	17	70·8	107
1863	4	2	...	...	8	7	6	4	1	1	8	5	7	2	2	...	1	...	2	1	6	2	14	6	59	30	50	385
1864	2	2	6	3	3	2	9	3	7	2	1	1	7	5	5	2	2	2	4	3	11	6	4	3	61	34	55	156
1865	...	...	...	...	2	...	3	1	6	2	2	1	3	2	...	...	4	2	11	8	17	6	18	12	66	34	51·5	93
1866	2	1	...	...	1	1	11	4	3	...	2	1	2	1	3	1	...	...	2	1	2	2	2	1	30	13	43	117
1867	1	1	...	...	...	...	3	2	2	1	...	...	...	...	...	...	...	...	...	...	1	...	3	3	10	7	70	95
1868	23	19	1	1	7	3	19	8	3	2	...	...	6	4	2	1	...	...	3	2	35	25	16	13	115	78	67·8	460
TOTAL ...	36	29	9	5	30	21	67	27	35	17	34	22	25	14	13	4	20	13	27	18	92	59	79	54	467	283	60·5	...
Ratio for each month.	80·5		55·		70·		40·3		48·5		64·7		56·		30·7		65·		65·		64·1		68·3		...	...	...	...

Table shewing the admissions, deaths, and average mortality in the various hospitals at Dacca between 1830 *and* 1868.

HOSPITALS.	Admissions.	Deaths.	Percentage of deaths to admissions.
In-patients, Native Hospital, 1830—1838 ...	50	24	48
Native Hospitals, 1840—1858	441	274	62·13
Government Dispensary, 1841—1858 ...	67	37	55·22
Lunatic Asylum, 1842—1867	332	181	5·45
Jail Hospital, 1838—1867	320	157	49·06
Mitford Hospital, 1859—1867 ...	352	205	5·79
Ditto 1868 ...	115	78	6·78
TOTAL ..	1,677	956	56·9

Table showing the admissions from cholera in the various hospitals at Dacca in each month of the year from 1839 *to* 1867.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
In-patients, Native Hospital 1840—1858 ...	20	19	44	42	34	14	26	20	21	69	64	68	441
Out-patients 1840—1858 ...	143	203	365	811	255	118	115	118	172	353	513	327	3,493
Jail Hospital 1839—1867 (1847)	10	37	68	69	40	23	11	13	12	32	42	35	392
Mitford Hospital, in-patients 1859—1867	13	8	23	48	32	34	19	11	20	24	57	63	352
Mitford, out-patients 1859—1867	25	52	85	161	116	77	98	85	121	84	143	86	1,133
Lunatic Asylum 1841—1867	14	3	4	9	7	2	6	20	2	5	36	20	128
Total	225	322	589	1,140	484	268	275	267	348	567	855	599	5,939
Monthly Average ...	3·7	5·4	9·9	19·1	8·1	4·5	4·6	4·4	5·8	9·5	14·3	10·	...

Table showing the prevalence of cholera at Dacca during the different seasons of the year.

	Native Hospital.	Mitford Hospital.	Jail.	Lunatic Asylum.	Total.	Average temperature.	Average Rain-fall from 1850 to 1867.
Hot Months.						°	In,
March, April, May	1,551	465	177	20	2,213	81·36	18·68
Wet Months.							
July, August, September ...	472	354	36	28	890	83·54	36·67
Cold Months.							
November, December, January ...	1,135	387	87	70	1,679	70·84	1·85
Transition Months.							
February, June, October ...	776	279	92	10	1,157	79·15	20·40
Total	3,934	1,485	392	128	5,939	...	77·10

Abstract of the Sanitary Report written by Dr. Wise, Civil Surgeon of Dacca.

No. dated 15th February 1867, to the Deputy Inspector General of Hospitals, Dacca Circle.
Silting up of the Boorigunga River.

1. My predecessor in his report for 1865, dwelt on the serious danger that has been threatening Dacca for several years by the closing up of the river Boorigunga at its head. During the last rainy season the amount of water flowing through the Boorigunga has increased, and the channel, where the *chur* was forming, has deepened. At present, therefore, there is less cause of fear than then. In my predecessor's remarks on the serious consequences which would follow the closure of the Dacca River, I entirely concur. Bad as the river is at present, it would undoubtedly be much worse then. Every precaution that engineering skill can suggest, ought to be taken to keep the river open and to prevent its becoming a mere tidal creek, up and down which the refuse and sewage of the city would float.

DRAINAGE OF THE CITY.

2. The masonry drains that do exist in the city have no outlet, and are always filled with a simmering liquid nauseous to the smell, and injurious to all living in proximity to them. The houses of the rich, are if possible, more filthy

than those of the poor, and no means are taken to clear the cesspools attached to them

3. In very many premises wells are dug which are converted into cesspools; in others the filth is thrown into a corner and covered with a few wood ashes. The dangerous quality of the water in the masonry wells throughout the town is chiefly to be referred to the percolation from these sources.

CEMETERIES.

4. The number of cemeteries within the city is far beyond the requirements of the place; 56 recognised burial grounds exist, and some of these are situated in waste pieces of land in close proximity to tanks and wells. A central position should immediately be selected beyond the city, and all intramural sepulchres forbidden.

No. dated 8th March 1867, to the Secretary to the Sanitary Commissioner for Bengal. Demand for vegetables.

5. In the city of Dacca, English vegetables are bought in the bazaar, and are highly valued by the richer classes. Potatoes from Cherrapoonjee find a ready sale, and a superior sort, grown near Kolatua Hât, on the north-west of Dacca, are also procurable in the bazaars at certain seasons.

Lukhya water.

6. The Lukhya is renowned for its pure water.

Drinking water.

7. The water of tanks, *khâls*, rivers, ponds, marshes and wells is used for drinking purposes by the inhabitants of the district. Natives show little discrimination or care in the quality of water they drink. They will use the river water at the outlet of a sewer or at the place where a corpse is floating without compunction. They wash their persons, hawk and spit into the water, then fill their *lotahs* and drink it with as much gusto as if drawn from the purest spring.

Lukhya water.

8. The water of the Lukhya, the Seetal Lukhya, is famous throughout Eastern Bengal for its purity. Like the Brahmapootra and its branches, the current is clear and unsullied by earthy matters, and flowing through a country destitute of large towns, it retains the purity of its parent river. The residents of Dacca subscribe for a regular supply from this source, and the natives send long distances for it.

Well water in Dacca.

9. The water of the wells in Dacca is always impure. The natives in the north of the town inform me that those who drink water from wells in their neighbourhood for the first time are always attacked with diarrhœa, but that

continuing to do so, the system becomes tolerant of it, and no injury results. It is impossible to remedy this evil, while deep holes are dug as receptacles of sewage, and cesspools are placed in dangerous proximity to the wells' mouth.

Uncleanliness of Dacca.

10. Dacca has long been famed for its uncleanliness. In 1713 it is described by a Jesuit priest as follows: *"Pour ce qui est de la ville rein de plus sale et de plus mal propre."* He says the streets are full of dirt and ordure which (s'y. rassemblent) collect after the slightest shower.

The lapse of 153 years has brought with it considerable improvement, but still much remains to be done. At the present day the sanitary condition varies in different parts of the town. For a short distance from the river the streets are comparatively clean, but as the centre of the city is reached, many very objectionable localities are to be found. Drains in many instances constructed of masonry exist, which have been built according to the pleasure of the landholder, who seems generally to have constructed them regardless of their having any outlet. As a consequence, during the dry season from November to May, they become converted into cess-pools full of stagnant water, and all the abominations which issue from a native's domicile.

In some cases the *ungna* or court-yard of a native's house is used as a cess-pool. The inmates perform their ablutions and other daily actions on this place. No drain exists to carry off the water, which never evaporates entirely, but leaves an offensive unhealthy cess-pool, injurious to all around. The houses of the wealthier inhabitants have as defective conservancy arrangements as those of the poorer classes. Spouts pour down the sewage of the upper rooms to the ground outside, so that at one, if not at many sides, a large stinking hole is found, which is never cleaned out.

Alongside the chief roads of the towns, drains kept clean by the Municipality, exist; but in the densely inhabited *gullies* and lanes, no amount of cleanliness would be of much use while the system of drainage is unchanged. In the northern parts of the town, brushwood and jungle generally have grown up excessively of late years. Tanks covered with decaying vegetation; shallow pools which dry up in a month or two after the rains cease, and *khâls* which retain water long after the stream through them has ceased to flow, are very common and must be prejudicial to the health of the people.

On the north-west also the jungle has been advancing towards the inhabited parts within the last forty years. The land is irregular with slight wood-elevations in the midst of swampy ground. This jungle covers an area of many miles, and is almost continuous with the forests of Bhowal and

Mhooydopore in Mymensingh. It is considered by the natives to be unhealthy. The residents on its borders are pale, thin, and generally affected with spleen. The fever so prevalent in November and December, when the wind blows from the north-west, is generally referred to this cause.

Various sources of unhealthiness.

11. On the east, across the Dolye Creek, vegetation has buried the sites of what were formerly the houses of rich boat-builders. One after another these houses have been left tenantless. The rapid growth of plants, the ravages of white ants, and the rains have done the rest. Nothing but raised mounds, with stagnant pools around, are left to mark the site of former prosperity and wealth. In this direction the ancient brick-fields lay, from which old Dacca was built. The holes and pits, now pestilential spots, were the places where the earth was dug. The ground being low and no drainage possible, the whole tract became a hot-bed of malaria. This appears to be the true explanation of the blight that has fallen on the once flourishing village.

The Boorigunga, which runs along the whole southern face of the city, being a tidal river, is a source of unhealthiness. A broad fringe of slimy mud is left during the ebb tide, to which the boatmen and residents of the river's bank resort for natural purposes. Many indentations also exist, which are receptacles of decaying vegetation and animal remains. Connected with the river, are numerous *khâls* which in the rains are full of water, rising and falling with the tide. In the dry months they dry up throughout the chief part of their course. The banks of these *nullahs* are converted into latrines, poisoning the air in all directions.

Alongside the chief *khâl*, and in the centre of the town, is an irregular piece of ground where bricks appear to have been prepared for many years. The large stagnant pools overgrown with plants, prove a source of malaria and disease.

The most objectionable practice of digging *kutcha* wells, into which all the *excreta* and rubbish of the house are discharged, is almost universally adopted in Dacca. In many instances, however, a corner of the compound is surrounded by a mat, behind which the inmates defæcate. No deodoriser is, as a rule, used; ashes are, however, occasionally thrown into it. In Dacca, *mehters* are with difficulty to be got. By the rich, a sweeper is at times engaged to clean out the privy. This operation is, however, never thoroughly done, and no dry earth being thrown in, the soil becomes saturated with ordure, and very offensive. The existence of the *kutcha* wells, often in close proximity to masonry ones from which water is drawn, causes serious pollution by percolation. The people of Dacca have learned by experience to avoid drinking water from these wells. In some cases where the people are too lazy, or live at a distance from the river, the water is made use of, but this is quite exceptional.

The overcrowding of the native houses, and the entire absence of ventilation are fruitful causes of disease. The densely inhabited bazaar, called the *Sakri;* is famous in Dacca for its unhealthiness. The houses are from two to three stories high, with a frontage of about one-sixth of their depth. A long dark passage runs through the building. Along its sides there is not a single window or door but the one-leading to the upper floors. The inhabitants are, as a class, poor. They work as shell-cutters, and are naturally a sickly race. Their houses are terribly overcrowded. Cholera and small-pox, when they do break out in that locality, cause great loss of life.

The lodging houses, rented by the boys attending the college and schools, are also most unhealthy. The boys, generally of poor parents, club together and crowd the rooms until there is scarcely space for moving. All the windows and doors are carefully shut up at night, and there being no other apertures, it is astonishing that those asleep inside, do not become asphyxiated. The pale anæmic looks of these boys and the great prevalence of diarrhæa and cholera among them, is to be referred in part to this deprivation of pure air. One striking instance of overcrowding was met with lately: a boy having been seized with cholera, at a time when the disease was unknown in the town, I made enquiries, as to where he had slept the previous night, and an area of 6 × 5½ × 11 was pointed out. It possessed no window. The only openings were two doors about 5½ feet high, one leading into a narrow passage, the other into another room. These doors were closed at night, so as to be almost air-tight. In this lair three boys slept, with the allowance of 11 superficial feet or 121 cubic feet of air.

This is no exceptional case. Many equally crowded rooms are to be met with throughout the town. The native house, inhabited by the rich man, is as regards ventilation, inferior to the grass-roofed hut of the bazaar. The former is carefully sealed up in the cold season, and fresh air is dealt with as a pernicious principle. The poor man enjoys a free circulation of air, as long as he abstains from surrounding his hut with dense groves of vegetation.

The burial of the dead in Mahomedan cities is always carried on in an objectionable manner. It is performed in the first waste place, on the bank of tanks or in the small compounds surrounding the dwelling house. The graves are of insufficient depth, and are carelessly filled in. Mahomedans confess that this custom is an obnoxious one, but the desire of being interred where their ancestors were buried before them is a paramount passion, and they are blind to the consequences of having a grave-yard in the midst of the habitations of the living.

CEMETERIES, DISPOSAL OF THE DEAD.

12. In Dacca within Municipal boundaries, there are fifty-six recognised Mahomedan burial grounds. The majority are in the outskirts of the town, and in the jungly tract bounding the north and north-western suburbs; others, however, are situated in the centre of densely inhabited places. Up to the present date I believe none have been shut up by order of the Municipality. Preparatory to doing so, a large piece of waste ground on the north of the city, has been fixed upon by the Committee, and opened as a public grave-yard. This promises to reduce the number of private burial grounds, as the Municipality will now have the power to recommend the closure of the most obnoxious ones. Throughout the district generally, the dead are buried in the first waste piece of ground in the neighbourhood of the village.

The Hindoo dead in Dacca are either burnt on the banks of the Dolai *khâl* near Doyagunge on the east of the town, or on the Bagchandka *Chur* in the Boorigunga to the west of the town.

13. When the deceased is a beggar and has no friends, the mouth is touched with fire, two *ghurras*, filled with earth, are fastened, one round the neck, the other round the loins, and the body, is thrown into the river. A bamboo pole is driven through the belly into the bed of the river, so as to prevent its floating away. Where the river has lofty banks, as in the Lukhya, the public *ghâts* are selected as the fittest resting place for corpses. The living, however, have no scruples in drawing water from the vicinity. It would surely be possible to introduce some legislative enactment to put a stop to this disgusting usage, which even to Hindoo minds must be unsavoury.

Silting up of the Boorigunga.

14. The most serious change that has been threatening of late years, however, is the closure of the Boorigunga at its head. During the last forty years an enormous *chur* has almost closed the mouth of the Brahmapootra at Jamalpore, and within the last few years a similar catastrophe has been threatening the Boorigunga. Last year, however, the current at this place was deeper than in 1865. Such an occurrence as the above would ruin Dacca, and render it uninhabitable. Bad as the river is now, it would become then a tida lagoon, up and down which the filth and sewage of the city would be borne by the flood and ebb tides.

DACCA MUNICIPALITY.

15. The Committee have not as yet agreed upon any comprehensive plan for draining the town, and for disposing of the town sewage. Until these two subjects are taken up and successfully treated, the Dacca Municipality cannot be said to have performed the work given it to do.

LATRINES.

16. In the town of Dacca, there have been for several years seven public latrines in use, which appear to be chiefly supported by regular visitors. The seats are always constructed of masonry, but without any paving at the bottom. These seven latrines afford accommodation for fifty persons at a time, they are without roofs, and are simply spaces enclosed by bamboos and matting.

These Dacca latrines are owned by sweepers, who pay rent for the land. They are under no special management. The interest of the owner in keeping them clean is the only incentive to his doing so.

Two charges are levied in these privies, one for monthly and regular visitors, the other for casuals; the former pay at the rate of from 1¼ annas to 2 annas, the latter if respectable, ten *gundas*, (½ a pice) if poor five *gundas* (¼ of a pice.)

The monthly income of the most frequented privy amounts to six Rupees, of the others from four down to one Rupee.

The dry-earth system is not adopted. The difficulty of procuring earth, of digging it, and of employing a man to use it are the chief causes of its being neglected.

In three privies, the *excreta* are daily removed and thrown into the river. In two the soil is put into earthen jars daily and when these are filled, which happens in two or three days, the contents are discharged into the river. In one privy the filth is allowed to remain where it falls and is never carried away. In the last, the *fæces* are buried in pits alongside.

Throwing dead bodies into the river.

17. The system which has long existed of allowing the carcases of dead horses, cattle and other animals to be thrown into the river, because it is less expensive than burying them, ought to be forbidden by severe penalties.

Want of a sufficiency of funds.

18. In Dacca and other large towns of the district the want of broad streets is a serious drawback. The numerous fires which occur during the hot months of the year ought to be utilized, and the vacant spaces taken up for

the improvement of the roads. The great obstacles to this, and to all sanitary improvements, is the want of sufficient Municipal Funds. The present income of the Municipalities is expended on the pay of a Police which is allowed to be more inefficient than the old Chowkeedars, and on an establishment of *mohurrirs* and *mehters* who are too dignified to carry out the work appointed for them to do.

No. ,dated 6th April 1867, to the Secretary to the Sanitary Commissioner for Bengal.

19. Fevers are most prevalent in Dacca during the cold months, when the wind blows from the north, across the extensive jungles which lie in that direction The *mohullahs* next to these jungles are very sickly during November and December, and a large proportion of the children suffer from enlargement of the spleen.

Polluted drinking water.

20. The natives of Dacca attribute the outbreak of cholera to the impure water which they drink. In April the tanks and reservoirs generally, are at their lowest and contain most polluted water. In November again, those who make use of the river-water complain that as the inundation recedes, and the drainage of the *bheels* and low-lying tracts is poured into the main stream, its water becomes of a dark brown hue, very offensive and quite unpalatable.

Description of Dacca (District.)

21. The sanitary condition of all the towns and of the district generally is most disgraceful. Each village is worse than its neighbour, in proportion to its age. A village newly settled on an open *chur* or plain is as a rule salubrious It may be more liable to epidemics of small-pox and cholera, but it escapes the constant enervating malarious poisoning, which older settlements suffer from. Bengalees are so thoughtless and ignorant of sanitary laws, that with their new houses they prepare seeds of future disease. They raise their houses by digging irregular holes, which become the household privy, cess-pool, and tank. To protect their females from the eye of the stranger, and to provide shade, they surround their plot of land with hedges which in the course of time become forest trees. These trees generally bear fruit, become valuable, and are never thinned. As years roll on, the villages become buried in vegetation, malaria abounds, the inhabitants are enfeebled and unable to cope with the forest around them, an epidemic fever breaks out, and the survivors migrate to new land where similar habits are followed, and equally fatal epidemics recur. Such is the true chronicle of a Bengal village, and it is difficult to point to any inland town which has not passed through these successive stages.

In the towns of the district, sanitary laws are as completely ignored as in the villages. Cess-pools are found on the banks of tanks or within a few feet of a well. The dead are buried in the midst of the living; the sewage is never removed. The rains convey it into the river, where the only wholesome water is procurable. Vegetation is not eradicated. Tanks are never cleaned; and the drains, which do exist, are never flushed, and have rarely any outlet. Privies, if made at all, are constructed near a tank into which the first rain carries the sewage. Such is an unexaggerated description of the condition of Dacca and of all the large towns at the present time.

Dacca Municipality.

22. The Dacca Municipality is the only one in this district, and its failure as a sanitary body is most signal. This arises from its constitution. It has too many members, and their power is too much limited by laws. A Committee consisting of the Magistrate, Civil Surgeon and a non-official member, would be more useful, and better qualified to carry out sanitary improvements than the present cumbrous machinery. It is self-evident that the permanent residents, who have a personal interest in the healthiness of a town, ought to be the persons entrusted with its conservancy. In the present Municipalities, the native members vote in a body with the officials, and whatever the Chairman recommends is carried without discussion or consideration. Natives are not fitted to give an opinion on sanitation. The best educated of them, with rare exceptions, keep their own premises as filthy and offensive as the poorest house-holder. Their religion, their habits, their family arrangements, all ignore any connection between health and cleanliness. Yet these are the individuals selected to enlighten the people on the best means of preserving health, and upon whom devolves the responsibility of keeping a town clean and healthy.

Dacca Municipality.

23. During 1867, no sanitary improvements of any importance have been executed. Keeping the roads in the European quarter metalled, and the drains open, exhaust the energies of the Commissioners; and the densely inhabited quarters of the city with their narrow lanes and obstructed drains are allowed to give forth poisonous emanations and to generate disease.

The finances of the Municipality are insufficient to keep the city in a cleanly state, but a great deal might be done with the small sum available, if it was expended judiciously and practically.

The income of the Municipality amounts to Rs. 50,000 per annum. A little over 6,000 is laid aside for conservancy, and there is a sum of Rs. 14,000 which is set apart for improvements generally. This is a paltry sum with which to keep a city, over three miles long, and varying in breadth from a quarter to one mile in a proper sanitary state. By doing a little yearly, the town would gradually be improved, but the system now followed is to do nothing, because the funds will not admit of all being done that is required."

INTRAMURAL BURIALS.

24. "The burial of the dead in the midst of the city ought to be prohibited at once, and licensed cemeteries should be opened on the outskirts, where the poorest could be interred, with only a nominal fee for keeping up a proper guard and preventing *jungle* from growing.

Suggestions for the sanitary improvement of Dacca, dated 16th August 1867. To the Chairman of the Municipal Commissioners, Dacca.

25. All allow that the most feverish parts of Dacca are those bordering on the jungle towards the north. No attempt has ever been made to drain the large marshes in that quarter, or to keep down the excessive growth of jungle, but until measures are taken to stop these two causes of disease, it is hopeless to expect any improvement in the health of the people.

Want of drainage—abominable practices with regard to sewerage.

26. It is now, as it always has been, the practice to permit the filth and sewage of Dacca to be discharged, and to accumulate in the midst of the habitations. Beyond a few surface drains, which have generally no outlets, and lead nowhere, Dacca may be said to be without any. The remains of several large masonry sewers have been met with in different parts of the city, which were constructed by the Mahomedans, but these have fallen into ruin, and are now buried under several feet of soil.

Here and there, throughout the town, deep and very narrow drains have been constructed for short distances by private individuals, but they never lead into the river. They are most abominable nuisances, as they are always filled with decomposing animal and vegetable matters, and emit the most noxious odours. In the storied houses of the richer classes, the sewage of the upper rooms is discharged through pipes on to the ground outside, into the compound of the house, or into a public drain. Underneath the spouts there is always a cesspool which is very seldom cleaned out.

In houses with an interior quadrangle, the open square is used as the receptacle of all the sewage of the house. In one corner there is usually an open privy. In some houses a foot of black simmering fluid is to be seen in these quadrangles, giving forth the most sickening smell. The first impression on the mind of the stranger is the impossibility of human beings living whilst breathing such a foul and poisonous atmosphere."

"Another system by which the inhabitants get rid of the sewage of their houses is by throwing it into *kutcha* wells. These wells are often within a few feet of that from which water is drawn. No wonder that there is a general complaint that well water in Dacca is undrinkable and productive of disease.

However disposed of at first, the whole of the sewage of Dacca ultimately reaches the river. Any proposal, therefore, to improve upon the present state of matters must be considered in connection with these two existing facts, viz., that the sewage is now discharged into the river, and the open drain system is no novelty in Dacca."

Extract from a letter on the sanitary condition of Dacca, addressed to the Chairman of the Municipal Commissioners, by Assistant Surgeon H. C. CUTLIFFE, F. R. C. S., *Officiating Civil Surgeon of Dacca.*

Summary of sanitary defects.

4. "It is customary in writing on the subject to which this letter is devoted, first to show the evils existing, and then to suggest the remedies which should be applied. The Municipal Committee cannot be ignorant of the evils which exist. The abstracts from Dr. Wise's reports will, I trust, excuse me for not detaining you with a repetition of long descriptive reports which, judging from anything that I can learn, have been utterly fruitless in practical results.

It must be admitted, I conceive, that in Dacca, for ages past, the *excreta* from the entire population of the city has been allowed to remain in and about the houses and the compounds of the people; that no conservancy system has ever existed; that the water in the wells of the city is horribly polluted; no means being taken to prevent the filth and *excreta* from finding their way into the wells, and that the river water is fouled by *excreta* and dirt cast along the bank of the river; that the streets of the city have been laid out without reference to the securing of a proper perflation of air, which in most parts of the labyrinth of narrow alleys of which the city is chiefly composed, cannot possibly circulate freely; that a pestiferous *khál,* fetid swamps, foul tanks, stinking drains, and uncontrolled jungle exist in the very midst of the population. In short, that no one can deny that the air which the people breathe is dangerously impure, that the water which they drink is horribly polluted, and that the soil on which they reside, besides being porous, damp, and undrained, is made up very greatly of the decomposing *excreta* of the present, and the more or less decomposed remains of the past generation."

The chief causes of excessive mortality and sickness in Dacca are preventible.

5. "*In an Indian city thus ill-ventilated, undrained,* and reeking with human ordure and filth of every description, it is not surprising that cholera is an endemic and very prevalent disease; that dysentery and diarrhoea are always rife, and that fevers ever prevail, and characteristically mark their terrible influence on the pot-bellied, spindle-shanked, feeble, and pallid creatures who survive its ravages. But though all this is true and the ghastly picture painted by Dr. Wise is in no way over coloured, we yet may see abundant reason to be of good courage, and to resolutely determine to put down these diseases; for they are all of them zymotic and local diseases, and they are therefore preventible.

Causes of the prevalence of cholera in Dacca.

6. What has been done in Europe, America and in India, in reducing the death rates from zymotic diseases by sanitary and conservancy measures, has been abundantly written on, and those who hitherto have given no heed to these subjects will do well to peruse the reports of Mr. Simon, the Sanitary Officer to the Privy Council of England. From one of Mr. Simon's reports I now extract a passage which, in two pubile reports,* I have already quoted.

'It cannot be too distinctly understood that the person who contracts cholera in this countary is, *ipso facto*, demonstrated, with almost absolute certainty, to have been exposed to excremental pollution; that what gave him cholera was, directly or indirectly, cholera-contagion discharged from another's bowels; that in short, the diffusion of cholera among us depends entirely upon the numberless filthy facilities which are let to exist, and especially in our larger towns, for the fouling of earth, and air, and water; and thus, secondarily, for the infection of man with whatever contagion may be contained in the miscellaneous outflowings of the population. Excrement-sodden earth, excrement-reeking air, excrement-tainted water, these are for us the causes of cholera. That they respectively act only in so far as the excrement is cholera excrement, and that cholera excrement again, only acts in so far as it contains microscopical fungi, may be the truest of all true propositions; but, whatever may be their abstract truth, their separate application is impossible. Nowhere out of Laputa could there be serious thought of differentiating excremental performances into groups of diarrhæal and healthy, or using the highest powers ot the microscope to identify the cylindro-tænium for extermination. It is excrement indiscriminately which must be kept from fouling us with its decay.'

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* On sanitary arrangements for fairs and places of pilgrimage in India, dated 11th October 1868 and No. 1 B of 1868 through the Commissioner Meerut Division, to Government of N. W. P.

"The truths contained in this passage are now universally admitted by those who have taken the pains to investigate what is known of the causes of cholera. In this passage Mr. Simon has told the people of Dacca why they are so sorely stricken with disease and death, and has pointed out to them what they must do if they would be healthy and live.

Health *versus* Money.

7. In a city where no conservancy arrangements exist, and no heed has been paid to sanitary requirements, it would be idle to think of carrying out any effective sanitary scheme without ample funds. To remedy the accumulated evils of ages must necessarily cost a large sum of money. If the people of Dacca can be convinced that the only way by which the healthiness of their city can be improved is by carrying out a complete system of sanitary measures; and if they can be shown, as I believe they can be shown, that these sanitary measures, though costly in the first instance, will in the end be highly remunerative, I cannot conceive that the mere question of funds will be allowed to stand in the way of sanitary reform, and to condemn yet longer a people to an extremely high death rate, and to a very undue suffering from disease.

A Municipal Loan.

8. The first suggestion then that I have to offer is, that the Municipality should raise a loan of money to be invested in carrying out a scheme of sanitary improvement for the city and suburbs of Dacca. Two or three lacs of Rupees would probably suffice to commence with; but the exact amount of the cost of carrying out a sanitary scheme will have to be computed by an Engineer, after the Municipal Committee have finally determined on the details of the scheme. As to the mode of investing this money, I beg to offer the following suggestions :

Ventilation of the city.

9. Ground should be taken up of sufficient breadth for two broad streets to be run parallel to one another, or nearly so, throughout the entire length of the city. Their direction would be nearly N. E. and S. W. Anticipating a spreading out of the suburbs, I should suggest that the ground taken up for these streets, should be laid out for a considerable distance beyond the present limits of the city.

Broad transverse streets should be run at right angles, or nearly so, across the main longitudinal streets. The result would be that the city would be thus mapped out into blocks, of which it would be most convenient that there should be in all about twelve."

Conservancy.

10. "Each block, or as many of them as the Municipal Committee may think necessary, should be accommodated with a public latrine adapted for the use of both sexes, and provided with a *Jemadar mehter*, and a sufficient staff of *mehters* and *mehteranees* under him. These latrines should be worked on the dry-earth conservancy system; and I would recommend the municipality to take advantage of the experience of the municipality of Cawnpore, and to follow out so far as is desirable, the system which has there, under the indefatigable exertions of Mr. Halsey and Mr. Birch, been so successfully worked. That the dry-earth conservancy system can be successfully worked in Dacca, may, I think, be inferred from what is done at the Alipore Jail, where Dr. Fawcus was lately so good as to show me his system working with excellent results.

The disposal of *excreta*.

11. The common difficulty experienced in the working of the dry-earth conservancy system, is in the disposal of the urine. The solid materials are easily deodorised, and carried away to ground set apart for the digging of shallow trenches in which the night soil is temporarily buried. But the urine saturates so large a bulk of earth as is difficult to procure, and expensive to remove. At Cawnpore, therefore, the fluids are carried off in tiled drains which are regularly flushed by water. Their contents flow into a neighbouring *nullah* which has a sufficient fall to ensure a running stream. In Dacca, it may eventually turn out that the fluid will have to be dealt with apart from the solid *excreta*. There would be no difficulty in making arrangements to prevent any solid matters getting mixed with the fluids, or in separating them if accidentally mixed, and in deodorising the fluids before they are finally disposed of. There are many details which will have to be considered by an Engineer. As a local Health Officer, I have now merely to say that both varieties of *excreta* must be got rid of with the greatest possible speed, and disposed of with the least possible danger.

Ground for the burial and utilization of filth.

12. For the burial of the filth a piece of ground must be set aside. I recommend that a large piece of ground to the north of the city should be taken up by the municipality, and kept under vigorous cultivation.

A Municipal, or Model Farm.

Cattle, poultry and other stock might be kept with profit to the farm, and great advantage to the city and station of Dacca."

"In Cawnpore, sugar-cane is the crop chiefly grown on the land manured from the trenches. At the Alipore jail, plantains have been found to yield the most profitable return.

Boundaries of the municipal lands.

13. The boundaries of the municipality should be accurately defined. I recommend that the waste jungle land around the city especially to the north, should, for a considerable distance, be included within the limits of the municipality, and that beyond these limits belts of ever-green trees should be planted (see Sanitary Report on certain districts of the Meerut Division by H. C. Cutcliffe, Sections 6, 7 and 8.) Space would then be secured for future extension of the suburbs, for conservancy grounds, for cemeteries, and for a farm, and, moreover, the growth of jungle could be kept down and irregularities in squatting be prevented.

Open spaces within the city.

14. If possible, one or two open spaces of ground within the city should be left unbuilt upon. They should be laid out as open grass-plots or as flower-gardens with ornamental trees. Such open grass-plots in the midst of the city would do much to secure a proper supply of pure air for the inhabitants.

Burial grounds.

15. All the burial grounds within the city should be immediately closed, and the graves decently covered in and protected. Should the inhabitants desire it, these old cemeteries might be defended from being built over, and be left as clean open grass-plots. Ground should be laid out for cemeteries in the environs of the city.

A market place and slaughter houses.

16. The present market-place would be discreditable to any town, and is conspicuously disgraceful in such a city as Dacca. Neat rows of iron-roofed sheds with paved floors and shallow drains should be constructed; slaughter-houses, properly arranged and judiciously located, are required.

Lighting the streets.

17. In Cawnpore, kerosine is used instead of gas for lighting the streets. It would probably be about the best material that could be used for lighting the streets of Dacca, which surely ought not to remain any longer in darkness.

The great prevalence of syphilis in Dacca.

18. There is another subject of vital importance to the people of Dacca, and it is one that I cannot pass over without some consideration. I allude to the fearful prevalence of syphilis in the city. This horrible disease saps the strength of

youth, impresses itself on an impaired constitution to the end of an existence shortened of its natural duration, and transmits itself through the innocent and unsuspecting mother, to a progeny born in disease and reared, if reared at all, in debility and proneness to innumerable disorders. I point to the unusual prevalence of syphilis in Dacca, and draw attention to what has been done in Europe, and in the Military Cantonments of India. I am not as yet sufficiently well acquainted with the private feelings of the natives on this subject, to venture on any definite suggestion as to what measures should be adopted, with a view to put a check to this terrible disease. If the people will agree to the adoption of such measures, I see no reason why the ordinary system adopted in continental cities, should not be enforced in Dacca.

Drinking water.

19. The supply of pure drinking water, is a *sine quâ non* in any sanitary scheme for the improvement of the healthiness of Dacca. Pure water must be had. I feel sure, that an Engineer will show how it can be had, if the people will pay for it. Whether it be paid for from the general sanitary funds, or from a special "Water Rate" as would appear to be better, the Commissioner will have to determine. In England we bring water to our towns and cities from very long distances, and when necessary we lift it by aid of steam power and distribute it by iron pipes. The cost of the expensive works undertaken for the supply is so divided amongst the consumers of the necessary element, that no one is impoverished in paying for what he requires. The Lukhea water brought to Dacca, and if necessary purified by passing through a series of silting pits and filters, would afford the requisite supply. The native gentlemen in Northern India delight in sinking wells, and so providing, gratuitously, pure water for the poor. Doubtless there are many charitable gentlemen in Dacca, who would be glad, if pure water were laid on, to avail themselves of an opportunity of constructing drinking fountains or water taps for the use of the poor.

The *khal.*

The *khâl* is a notorious nuisance. My notion is that the best way to treat it is to block up both ends, drain it, level it, and then build along or over it. If this cannot be done, the only other way of dealing with it, is to cut it into a canal with solid banks safely containing the water, and to drain and fill in the swamps, holes and *jheels* which abound by its side. The canal might be planted on each side with umbrageous evergreen trees. Flood-gates to regulate the quantity of water admitted into the canal would be required. The soil of Dacca, however, is porous and damp, and on these accounts the canal would be very objectionable."

Drainage.

20. A system of drainage is needed for the city. The old, deep drains should be everywhere abolished, and shallow saucer drains universally laid down. The swamps and pools require to be drained and filled in, and the jungle in and about the city to be rooted up.

Registration.

21. The municipal committee should at once commence a regular system of registration of births and deaths.

Alteration of Bye-laws.

22. I beg to urge the necessity of revising the Dacca bye-laws, and I commend to the notice of the municipal committee the rules contained in chapters III. and IV., pages 34 and 40, of the third Annual Sanitary Report for Bengal, (1866.) These rules would give an excellent basis on which to form a revised code of bye-laws for Dacca.

A Conservancy Officer and two Inspectors of nuisances.

23. It will be neccessary for the committee to appoint, on a liberal allowance, a conservancy officer, whose duty it will be to enforce obedience to the bye-laws in all their several particulars; to act as public prosecutor when necessary; to act as head inspector of nuisances; to superintend the conservancy arrangements, and to manage the conservancy staff, which should be immediately under his orders; to keep such simple accounts as the municipal committee may require, and submit to them, at stated times, reports of a formal nature, so that time and labour may not be too much absorbed from the out-of-door inspecting duties of the office. Under him two inspectors of nuisances would be required.

Importation of *Mehters*.

One hears of difficulties in getting *mehters* in Dacca. This is a mere question of money. In the North-Western Provinces sweepers get Rs. 4 per mensem; here they get 6 or 7. There would be no difficulty in importing from the North-Western Provinces as many sweepers as are required. It would be advisable to give them a *mohulla* to themselves. The conservancy staff of *mehters* might be provided with huts free of cost.

Ask the Bengal Government to depute a competent Engineer for the special duty of executing sanitary arrangements in Dacca.

24. I have now shown what must be done for Dacca, if its people wish to reduce the risks of their lives to the common average risk of life in other places in India. How these principles are to be practically carried out must be determined by a competent Engineer. I beg to suggest that the municipal committee should report to the Bengal Government the urgent reasons which exist for losing no time in carrying out effective sanitary

measures in Dacca, and should ask the Government to be pleased, at once, to depute a competent Engineer to Dacca, for the special duty of executing the sanitary arrangements which are required.

Ask the Bengal Government for gratuitous convict labour.

25. With a view to lose no more time than can be avoided in endeavouring to carry out the measures that may be determined on, I would suggest that the Government be petitioned to allow, as a special case, the prisoners of the Dacca Jail, to be employed, free of cost to the municipality, in the sanitary work which will have to be carried out with reference to the *khal.*

26. It will be evident to any one who has had any practical acquaintance with sanitary measures, that I have herein suggested nothing but what is very common-place and absolutely necessary to the reduction of the high death rate and great prevalence of sickness in Dacca. Judging from what has been done in other cities in India, I cannot doubt that money judiciously invested in the improvement of the city, would return a very high rate of interest. Financially considered, the proposal is—*first,* to spread out, in order and regularity, a population over an area of ground of which that now unoccupied is of very little value—*second,* to purchase land which is now covered with *jheels,* swamps, and jungle, and after having drained and levelled it, to build over it houses which would command remunerative rent—*third,* to purchase ground now occupied by wretched huts and mean hovels, and to replace them by edifices which would command higher rents from more wealthy persons—*fourth,* to lay out with regularity and due reference to sanitary requirements, new streets in and around the city, and to adapt the houses of these streets to the pecuniary means of the future tenants. Some of these streets would be laid out through the city, on land of which much is now absolutely valueless, and others would be laid out around the city on land now fetching a mere nominal rent. I submit that by thus improving the value of the property purchased, the investment of money in carrying out the suggestions which I have enumerated would be surely remunerative."

10.—MYMENSING.

THE FOLLOWING NOTES HAVE BEEN SUPPLIED BY DR. HENRY WILSON :

I. "The district of Mymensingh lies between the parallels :

Latitude 24° 4′ and 25° 41′ *North.*
Longitude 89° 28′ and 91° 13′ *East.*

"The portions of the district that lie on the two great rivers, the Brahmapootra and the Jumoona, are certainly healthy ; but in many parts of the district, the inhabitants are solely dependent for their drinking-water on *khâls,* which, during the cold and hot seasons partially dry up, and the water of which becomes polluted by decaying vegetation; in these portions of the district, cholera, fever, and dysentery are of frequent occurrence.

IV. The older inhabitants of this district all agree in stating that the unhealthiness of the district has, of late years, been increasing. This cannot be attributed to any single cause, but may, I think, be referred mainly to the combined action of the following:

(a.) The main stream of the river Brahmapootra has of late years left its old bed and taken the course of the Jumoona River.

As a consequence, large *churs* have formed opposite the station, and in other parts of the river, and (a more serious consequence) *khals,* which used to be full throughout the year, are now for six months half empty, causing great deterioration in the water drunk by the inhabitants of the many hundred villages which are situated on these *khâls.*

During the rainy season, the *churs* are covered with water, but during the dry season by tamarisk bushes and a long coarse grass.

During the months of April and May the *churs* are constantly moistened by frequent and heavy showers of rain; during the latter months of the year the subsidence of the river gradually takes place, and for two or three months these *churs* are left in a marshy condition; during these two periods of the year, you have thus present the conditions most favourable for the production of malaria, *viz.,* an alluvial soil with alternations of strata of sand and sandy impermeable clay, mixed with the products of vegetable decomposition, all exposed to the combined action of intense heat and moisture.

As I before stated, good tanks should be built in all these villages situated any distance from the great rivers; and the superabundant jungle should be kept cut. I consider many parts of the district to be very malarious, more especially the immediate neighbourhood of the Modhupoor Jungle, and the Terai at the foot of the Garrow Hills. The local causes of malaria noted above are present to a greater or less extent in all the large towns and villages in the district; to a considerable extent in the towns of Jamalpoor, Shahpoor and Mooktagacha; to a less extent in the villages on the Jumoona River.

(b.) The supply of water in the towns and villages on the large river is good; but in the interior parts of the district, the people drink from bad tanks and half empty and stagnant *nullahs.*

The water from the large rivers is good, also that in many carefully kept tanks. The water has never to my knowledge been analyzed. The natives consider the water of the Brahmapootra particularly good."

“During the rains the supply of water is abundant; but during the dry season, the inhabitants of the villages situated distant from the river, find it impossible to obtain good water, except when they are supplied with good tanks or wells.’

The influence which the *churs* have exercised on the health of the inhabitants of Nusseerabad has been very marked.

(*c.*) Increase in the population of the towns, involving overcrowding amongst a people who live in defiance of all sanitary laws.

(*d.*) In Nusseerabad some of the increase in the unhealthiness may be fairly attributed to the state of dilapidation into which the drainage of the town has been suffered to fall; large *pucka* drains leading direct into the river have become choked up and are tumbling to pieces, the whole net-work of drains throughout the town being little else than receptacles of rubbish to the neighbouring inhabitants. During the year under report attempts have been made to improve the drainage, but without a special grant from Government, it will be impossible to put the drainage of the town into a permanently efficient state.

V. No attempt has been made to establish in this district a Register of births and deaths; I am, therefore, unable to furnish any table showing the annual percentage of mortality to population.

I have obtained the following figures from the mortuary returns submitted monthly by the Police. This is the first year in which these returns have been called for. I do not think they are to be relied on; the Chowkedars, from whom the information of any death occurring is primarily obtained, are not under the control of the Police, and I have reason to think, that the deaths from some causes are at times very much exaggerated, and as often overlooked.

Mortuary Returns for 1868.

Names of diseases.	Males.	Females.	Children.	Total.	REMARKS.
Fever ...	528	396	189	1,113	
Diarrhœa ...	20	9	12	41	
Dysentery ...	36	42	6	84	
Cholera ...	820	624	300	1,744	
Phthisis ...	42	6	...	48	
Child-birth ...	...	30	...	30	
Accident ...	48	48	72	168	
Other Causes ...	24	21	...	45	
Total	1,518	1,176	579	3,273	

"Taking as the population 12,21,779 souls, the rate per 1,000 for the year will be 2·67; this is an obviously small percentage, and is probably far under the mark. The mortality from cholera is, I believe, very much exaggerated. From enquiries made on the spot, during the height of the epidemic which occurred in the south-eastern part of the district, during the months of October, November and December, I calculated that about 300 deaths had occurred.

Cholera was prevalent in the town of Nusseerabad in the early part of the year, and also in other parts of the district, but not to the extent indicated by these figures. I doubt the desirability of submitting statistics so unreliable and so likely to mislead in every particular.

VII. The prevailing diseases in this district are malarious fever, dysentery, and affections of the spleen, and occasionally cholera. The south-eastern parts of the district, where extensive swamps and marshes abound are seldom free from intermittent fever, and during the months of September and October it assumes an almost epidemic character.

VIII. *Gôitre* is very prevalent in the north-western parts of the district, the inhabitants of which are supplied with water from the streams running down from the Garrow Hills. The prevailing diseases above mentioned are not peculiar to any locality. Leprosy and elephantiasis are common.

X. During the latter half of October and during the months of November and December a severe epidemic of cholera broke out in the south-eastern part of the district, in the vicinity of the Kishoregunge Sub-Division; a report was at the time submitted to the Sanitary Commissioner; it is difficult to estimate the causes of this particular outbreak; injudicious diet and a total neglect of all sanitary precautions in a great degree account for the frequent outbreaks of cholera which occur in this district, but why these ever-constant conditions should at a particular time or in a particular place give rise to cholera, it is difficult to say.

From enquiries I made on the spot and from reports subsequently sen in by the Native Doctor of Kishoregunge and by the Police, I ascertained that about 300 persons had died in Kishoregunge and the adjacent villages, the epidemic having lasted from the 4th of November to the 2nd of January. Cholera was also prevalent in the months of April and May in Nusseerabad and in many parts of the district, but to a much slighter extent. For some years cholera has made its appearance in this district during the months of April and May, and again in November and December.

The outbreak in April has for two or three years seemed to be connected with a bathing festival, which early in the month takes place at various places on the banks of the Brahmapootra River, and this year a great number of pilgrims passed through the district, from a great fair held at Moorshedabad to their houses in this and the Dacca District; during the month of April cholera was prevalent amongst them, and it spread in many of the towns and villages through which they passed.

XI. Disease is certainly more general throughout the district in the months of September, October and November, the prevaling diseases being dysentery and malarious fever.

That diet exerts a great influence upon the health of the people is shown by the prevalence of diarrhœa and cholera in the months of October and November, when all the lower classes begin to eat the new rice of the *áman* crop, which, till four or five months old, is very indigestible.

As before stated, I think the district is, in a sanitary point of view, deteriorating, and I believe this to be the case with many other districts in Eastern Bengal.

XIV. The population of the district has never been ascertained by census. Mr. Reynolds, in his statistical report on the district for 1866, estimated the population at 1,197,823 souls.

Following Mr. Reynold's calculation, and allowing two per cent for the annual increase in population, this in 1868 will be found to be 12,21,779. This estimate has no pretension to exactness, and probably falls short of, rather than exceeds the truth. I can form no estimate of the proportion borne by men women, and children, but taking the average of the entire district, it may be stated that the Hindoos constitute about one-third, and the Mahomedans two-thirds of the entire population.

Taking Hindoos and Mahomedans together it will be found, that out of every thirty-eight inhabitants, twenty-nine are engaged in agricultural pursuits.

The area of the district is as nearly as possible, 6,464 square miles, which gives to the square mile an incidence of 185¼ souls."

TOPOGRAPHICAL CHARACTERS.

" On an average the subsoil water may, in the dry season, be found within nine feet of the surface, in the rains about six or seven feet.

Both in the river Brahmapootra, and also in the river Jumoona silting more or less occurs every year; owing to this silting, as before stated, the main stream of the river Brahmapootra has changed its course, and the consequent formation of *churs* and drying up of numerous *khâls* has given rise to much disease.

Although in my opinion the diminution of the water of the Brahmapootra has exercised an unfavourable influence on the health of the district, it has increased its agricultural capabilities. The *chur*-lands are well suited to the growth of indigo and jute. The tamarisk bushes which grow so plentifully on them are valuable as fuel, and the grass is used extensively for thatching purposes. In time these *chur*-lands will be more cultivated, and will then exert a less hurtful effect on the health of the people.

The natural surface drainage of the country is principally carried off by *bheels* and tanks, which throughout the district are very numerous.

The district seldom suffers from want of water. All the principal towns, in this district are more or less surrounded by jungle and rank vegetation; notably so—Jamalpoor, Shapoor, Hooshahnpoor, and Kishoregunge, towns on the Brahmapootra river.

The town of Soulhunkully on the river Jumoona is the freest of jungle of any in the district. The civil station with the town of Nusseerabad has some low-lying ground on its immediate western side; here and there are two or three large *bheels* into which the drainage of the town and civil station principally falls."

METEOROLOGY, CLIMATE, &C.

" No meteorological returns were kept before the year 1866, and since then the only instruments used have been an Aneroid, a simple thermometer and a rain-guage. There is no wet and dry bulb thermometer, no maximum-minimum thermometer, nor any instrument for registering the force or direction of the wind. I here give the average temperature and rain-fall for each month during the years 1866, 1867, and 1868."

1866.

TEMPERATURE.	In January	64° 14	May	79° 25	September	83° 3
	In February	71° 10	June	81° 6	October	80° 4
	In March	72° 9	July	81° 8	November	74°
	In April	72° 7	August	84° 1	December	65° 3
RAIN-FALL.	In January	None.	May	12·2	September	9·9
	In February	1·7	June	23·4	October	8·8
	In March	None.	July	18·4	November	None.
	In April	4·5	August	16·4	December	None.

1867.

TEMPERATURE.	In January	60° 5	May	80°	September	83° 3
	In February	66° 36	June	80° 5	October	79° 96
	In March	74° 41	July	83° 32	November	71° 5
	In April	80° 67	August	82° 8	December	65° 2
RAIN-FALL.	In January	0·9	May	2·3	September	14·25
	In February	0·6	June	22·3	October	7·7
	In March	3·4	July	32	November	·8
	In April	1·8	August	16·77	December	None.

1868.

TEMPERATURE.	In January	65° 32	May	76° 46	September	81° 87
	In February	69° 17	June	81° 9	October	79° 61
	In March	76° 32	July	81° 9	November	74° 66
	In April	77° 71	August	82° 54	December	66° 29
RAIN-FALL.	In January	None.	May	11·45	September	1·04
	In February	None.	June	25·55	October	2·1
	In March	0·35	July	6·75	November	None.
	In April	8.87	August	22·7	December	None.

"The above returns represent as regards the temperature, the mean of four observations taken daily, at sun-rise, at 10 A. M., at 4 P. M., and at 10 P. M.

The observations are taken by the native doctor in charge of the jail hospital, in which building the instruments are placed; but these observations have been constantly checked by observations taken by myself with my own instruments.

There has been no great difference in the temperature observed during the last three years.

The total rain-fall for 1868 was 97·67 inches, as compared with 110·02 inches in 1867, and 95·3 inches in 1866.

The peculiarity of the climate of this district is its dampness, and the almost entire absence of that dry heat which in the Upper-Provinces precedes the rainy season. To this absence of dry heat I attribute the great rarity of liver disease and the greater prevalence of malarial diseases."

IRRIGATION, CROPS, WELLS, &c.

" The total area of the district has been before stated to be about 6,464 square miles; of this area there are about 230 square miles covered with water; the tract of the Modhoopore Jungle comprises an area of not less than 420 square miles, and there are other portions of the district to the extent of 470 square miles not fit for cultivation; so it may be stated, that there are in the district about 1,120 square miles of unculturable land, leaving 5,344 square miles fit for cultivation, and of this area it was estimated by Mr. Reynolds, that about 3,562 square miles are actually under cultivation. The figures will stand thus:

Cultivated land	..	... 3,562	
Uncultivated land ...	Culturable	... 1,782	
	Unculturable	... 1,120	
Total area of district ...	..	...	6,464

Wells are but little used in the district.

Tanks are very numerous throughout the district.

Food is, certainly on the whole, cheaper than in many other districts of Eastern Bengal.

The produce of the past year has been on the whole rather above the average of former years."

SANITATION, CONSERVANCY, &c.

" The sanitary condition of all the towns and villages is bad.

There is a Municipal Committee in Nusseerabad, who during the past year have done much to improve the town.

In the town of Sherpore there is a body of Municipal Police raised under Act XX. of 1856, but they appear to do nothing whatever towards the sanitation or conservancy of the town.

In Nusseerabad the Municipality are responsible for the sanitation of the town; but in all other towns and villages there is no one held responsible.

In Nusseerabad active interest has been taken in the subject by the Municipal Committee. During the past year, drains have been deepened and cleaned, jungle has been freely cut throughout the town; but much remains to be done.

The town should be drained on a different principle to what now exists; at present the water of the town drains into a large *bheel* on the south side of the station; it would be preferable to drain direct into the river; for this purpose deep *pucka* drains should be built, wide enough to carry off all the water from the town; this would entail an outlay beyond the resources of the Municipality, and would necessitate a special grant from Government.

As a rule, I do not think that the inhabitants suffer from the effects of bad drinking-water, except during the dry season in villages situated far from the river, and where there are no good tanks; the rain-fall in this district is very great, and during the rainy season there is certainly no scarcity of good water.

During the dry season the tanks and *khâls* more or less dry up, the banks are left marshy, and then become the seat of decaying vegetation, and often of human soil; these impurities, by subsequent showers of rain, are washed into the tanks and *khâls* and form the principal source of pollution during the months of November and December.

There exists no system of drainage worthy of the name in any town of the district except Nusseerabad, and even there it is very deficient. Ditches dug at the sides of the streets and roads, which do not communicate with one another, nor lead towards any particular channel, but are little more than reservoirs of stagnant and filthy water, can be scarcely called drains; yet no better system obtains in the towns and villages of the district.

In most of the large tanks fish are found, and more or less vegetable matter grows on the surface, more commonly the *Fucus Vesiculosus* and the

Nymphia Alba and *Odorata*; by these means the equilibrium between the products of animal and vegetable life is maintained, and the purity of the water more or less ensured. I know of no other means adopted for preserving the purity of the water, and when by these means the water is preserved particularly pure, it is more a matter of chance than the result of any care on the part of the owner of the tank. *Jute* as before stated is largely grown in this district, especially in the south-eastern parts; in such parts of the district the water of the *khals* and tanks must be frequently contaminated by the process of steeping the *jute*, and I have known many instances where water so contaminated has been the only water procurable for culinary or drinking purposes; I have never known it act as a source of disease, and July, the month during which the largest amount of *jute* is steeped, is generally a healthy one.

Well-privies are those most in use by the better class of natives, they are dug to a depth of about ten feet, the sides being supported by cylinders of glazed clay; the mouth of the well is generally covered by matting, a small shed being built over it. You will find these wells in a secluded corner of the compounds of all the better class natives. I do not think, as a rule, the water-supply is affected by them. There are no public latrines in this district.

No trenches are dug for the reception of excrementitious matter, nor are the excreta of sick persons disposed of with any particular care, except in the dispensary and jail, where the excreta are first deodorized with-dry earth and carbolic acid, and then thrown into a pit prepared for the purpose.

(*e.*) Throughout all the towns of the district accumulations of filth exist, and in this respect much neglect occurs, nor is there in force any general conservancy system.

(*f.*) Bodies are as a rule burnt on the banks of the river or *khâl* adjacent to the place in which the death has occurred. It is done carefully, and, as a rule, completely. The bodies of Hindoos sent in by the Police for examination are burnt; but amongst the population only the bodies of Hindoos of the better class are burnt; the poorer Hindoos throw their dead into the river. The bodies of Mussulmen sent in by the Police, are buried on the *chur* far from any habitation, but the same care is not exercised by the general inhabitants.

In Nusseerabad and in other towns situated on the river, bodies are thrown in to the river, often in the middle of the bazaar, without any reference to the direction of the stream; this custom has been attempted to be stopt by the Municipal Committee of Nusseerabad, but up to the present time not very successfully."

" There is no cemetery in the town of Nusseerabad, the Mahomedans bury their dead in their own compounds.

Except when malaria is present, the pollution in the atmosphere is certainly due to localized uncleanliness.

(*k.*) The diet of the people depends on the religion, on the caste, and also on the means of the individual. Amongst the Hindoos, the principal difference lies between the *Baishnabs* and the *Shaktas*. The *Baishnabs* take coarse boiled rice, *dâl*, vegetables and fish. The rice in this district is very plentiful, the grain is small, there is some difference between the *Aous* and *Aman* crops, the former being much larger in grain and moister, and as a rule, not so wholesome as the rice of the *Aman* crop.

In addition to the above enumerated articles the *Shaktas* are permitted to take the flesh of goats, pigeons, and deer.

Amongst the Hindoos, the diet is not sufficiently varied, or sufficiently nourishing; it acts as a predisposing cause of disease of the spleen, or rather of that impoverished condition of the blood associated with splenic derangement. In such cases when good nourishing diet can be given, the effect is soon apparent.

(m.) Intemperance is not common, I have known but few instances in the district; it is not a prolific source of disease and death.

Continued fever is rarely met with in this district, but I have seen three well marked cases of true enteric or typhoid fever.

2. I think cholera may be considered endemic to this district; sporadic cases are of frequent occurrence; occasionally the disease assumes the form of an epidemic. Such an epidemic occurred last year in the south-eastern part of the district; and for some years the disease has assumed an epidemic form, more or less severe during the months of April and May, and in the neighbourhood of Nusseerabad.

During the year 1868, cholera twice assumed an epidemic form,—during the months of April and May, and during the months of October, November and December.

With each of these epidemics the following conditions existed in the part of the district in which the cholera was most severe.

1. Bad water-supply.

2. Unwholesome food.

3. **Utter neglect of all sanitary measures.**

The first and less severe epidemic followed and seemed connected with a great gathering of people, which takes place in the beginning of April, at a bathing festival at several places on the banks of the Brahmapootra River.

The first epidemic seemed also connected with the passage of a large *number of pilgrims from a great mêla held in Moorshedabad.*

During the first epidemic the atmosphere was dry; the difference between the wet and dry bulb Thermometer being 15°.

The second and severe epidemic could be traced to no gathering of natives, nor to the passage of any pilgrims.

The atmosphere was very moist, the average difference between the wet and dry bulb Thermometer being 4° to 5° only. In neither epidemics did contagion appear to be a well marked feature.

In neither epidemic did soil appear to exercise any influence; it raged equally in the sandy and permeable soil of Serajgunge, and in the clayey alluvial and retentive soil of Nusseerabad and Kishoregunge.

During both epidemics the disease was almost entirely confined to the poorer classes of the community; sex appeared to exercise no influence; children were less frequently attacked than adults.

As stated above I have failed to observe evidence of diffusion by human intercourse to any great extent, but a close relation with polluted water and bad food.

Epidemics in this district have generally lasted about two months, and the cause of the subsidence and disappearance seem as hidden as those of the outbreak; nor have I been able to notice any great changes in the conditions present at the outbreak and at the disappearance of the disease.

The principal predisposing cause of the form of *dysentery* so common in this district is malaria, or rather that peculiar impoverishment of the blood engendered by malaria. The exciting causes are bad food, bad water, and great alternations of temperature, which occur in this district, particularly during the rainy season and the beginning of the cold season.

The form of dysentery so common in this district is not acute dysentery, but rather sub-acute; it yields readily to treatment, but the attacks recur frequently, until certain organic changes take place in the mucous membrane of the large intestine, which leads ultimately to ulceration, and the patient sinks. The disease is very rarely associated with any hepatic derangement, but with a very anæmic condition, and generally with enlarged spleen.

Could the supply of water in many of the villages be improved, could *the eating of rotten fish be stopt, and the general sanitary condition of the towns and villages be improved, this disease would be much decreased.*

In the jail it forms an important item amongst the cases of admission into hospital, and here I think the disease is greatly caused by the overcrowding which is such a constant condition.

5. Small-pox is always very prevalent throughout the district during the months of April and May. I believe the outbreaks which at this season occur are due to inoculation, which is still extensively practised during the cold weather; the seeds of the disease thus sown bear wide-spread fruit as the hot weather sets in.

The great remedy is the extension of vaccination and the prohibition of inoculation.

6. During the two years I have been in this district, I have seen only one case of hepatitis, and that was in a native who had come from Dacca for a few days. It is evidently a rare disease in this district.

(2.) The habits and customs of the people will be always difficult to control, yet many of these are, especially in crowded towns and villages, very productive of disease; foremost amongst them are the eating of rotten fish and other bad food; throwing the dead into the nearest river; or burying them, and not deeply, in their own compounds; the disposal of the human soil, and the sleeping at night in huts so closed as to preclude the possibility of any ventilation.

Zemindars should be made responsible for the healthy condition of their villages so far as it depends on removeable causes. Good tanks or wells should be dug in those villages situate any distance from large rivers; the excessive jungle should at certain times be cut down; and the head man in the village might be invested with power to enforce the removal of all filth. The Police might report on the condition of the villages, but I should question the advisability of giving them the power of enforcing any particular rules, as such might be made a means of extortion."

" Pilgrims pass through the district on their way to a great *mêla* at Moorshedabad, held in the month of April, and they often communicate cholera to the districts through which they pass."

VACCINATION, INOCULATION.

" There is attached to the sudder dispensary a vaccinator, who receives from Government a salary of Rs. 10 a month. There are now two extra vaccinators employed by the Municipalities of Sherpore and Mymensingh, respectively; the Rajah of Shanhan has a Vaccinator in his employ, and the Native Doctors of the Sub-Division and branch dispensaries vaccinate occasionally.

It is contemplated by the Municipal Committee very much to extend vaccination, entertaining occasionally, and for a short time, vaccinators who at favourable seasons of the year can go out into the district. If these measures be carried out under the active supervision of the Civil Surgeon, the small-pox now so prevalent will be sensibly diminished. I think the prejudices of the people are being gradually overcome.

The following table shows the results for the last three years:—

Year.	No. vaccinated.	No. successful.	No. unsuccessful.	No. doubtful.
1866.	682	537	110	35
1867.	895	774	82	39
1868.	924	779	136	9

It may be then seen that vaccination is, although slowly, on the increase."

QUARANTINE, SANITARY POLICE.

" The only measure of this kind I think called for is the diversion of pilgrims from the large towns, as they pass through the district from the *mêla* held at Moorshedabad. Their passage through Nusseerabad was last year prohibited, and I think much cholera in the town was thereby prevented."

EPIZOOTICS.

"On this subject I have had no experience, but there occurred in the immediate neighbourhood of the civil station a wholesale poisoning of cattle by arsenic. Two thousand head of cattle were reported to have been so destroyed;

the symptoms were very similar to those described in some of the epidemics amongst the cattle of Lower Bengal, viz., unsteadiness in the limbs, vomiting, purging, and death in from six to nine hours.

Ten *mochees* were convicted by the Sessions Judge; arsenic having been found in their possession, and in bundles of grass which they were seen to administer to the cattle. I examined two of the cattle, and although I failed to find amongst the huge mass contained in the stomach any arsenic, I found the gullet and all four stomachs inflamed as from the effect of some irritant poison; and an analysis of the powder found strewed on the ground where the cattle grazed and found in the houses of some of the accused, confirmed the fact that the cattle had died from the administration of arsenic."

11.—TIPPERAH.

THE REPORT IS FROM DR. GREENE, CIVIL SURGEON OF COMILLAH.

1. "Comillah, *Latitude* 23°27′ *North.*
   Longitude 91°34′ *East.*

2. District of Tipperah, Division of Chittagong.

3. I consider Comillah healthy, comparatively speaking.

4. Every year Comillah is improved in its sanitary condition, especially since the introduction of the Municipality; previously nothing seems to have been done towards sanitation, tanks being neglected, and jungle allowed to overgrow; still a great deal remains to be done.

Out of 212 people attacked with cholera 113 died; as the number of the population of the villages in which cholera appeared is not known, proper death rates cannot be given.

8. Leprosy and elephantiasis are both common.

10. The only exceptional sickness which occurred during the year was an outbreak of fever at a village by name "Dhamptee", situated about 18 miles from the Sudder Station. This fever appeared suddenly about the middle of May 1868; out of a population of 3,000 souls 300 were attacked, and 40 of this number succumbed within one week. The presence of cholera in the Jail prevented my going out personally and investigating the nature of the disease; a Native Doctor was, however sent, who remained there until the 29th June during which time he treated the following number:—

Intermittent Fever	402
Remittent Fever	61
Other Diseases	24

"The symptoms of the intermittent and remittent fever did not differ in any respect from those of ordinary fever of the same type, except in rapid prostration of strength from the commencement of the attack. Out of the number treated nine fatal cases occurred, seven from remittent, one from intermittent fever, and one from dysentery.

11. Fevers occur generally at the changes of the seasons, and cholera during the months of December, January, February, March and April; small-pox during February and March; the latter is set-up by inoculators. The sudder jail during the year 1867 was comparatively healthy, as will be seen by the following :—

Average strength for the year	.. ..	334·3
Ratio per cent of sick to daily average strength	..	2·39
Ratio per cent of death, to daily average strength	..	2·02
Ratio per cent of death, to average daily sick	..	0·46

13. The people as a rule look healthy and able-bodied; they are seemingly industrious and thrifty.

The population of the district of Tipperah is said to be 700, 500.

The incidence of population to the square mile is 264·6.

The whole district is under water during the months of June, July August, September, and October.

Comillah, the Sudder Station of the district of Tipperah, is situated on the left bank of the river Goomtee, all the land on which the houses of the residents, public buildings and town are built, has been artificially raised by digging tanks, of which there are 212 in number, within an area of five miles, the river runs to the east of the station and is kept from inundating it and the surrounding country by artificially raised embankments. Paddy cultivation is carried on even within the station, where the land has not been raised; there is no extensive jungle-tract near, but there is a *bheel* or marsh to the north-west of the station; it is not very extensive, and is partly cultivated; a good deal of the water of the station drains into this *bheel*, its average depth being about two feet.

When the wind veers round to the north-west this *bheel* gives rise to a good deal of fever amongst the Police, whose barracks are situated at its eastern extremity.

The only remedy I can suggest is to convert it into a large tank."

METEOROLOGY.

"The mean average monthly temperature of former years at Comillah is as follows:—

January	64·°7
February	68·4
March	75·6
April	81·1
May	82·
June	81·5
July	81·6
August	81·8
September	81·3
October	80·2
November	72·2
December	65·8

The mean temperature of the present year to the end of October has been as follows:—

January	65°
February	69
March	77
April	80
May	82·1
June	81
July	81
August	83·1
September	82
October	80

The Barometrical observations for the past & present years have been as follow:—

		Maximum.	Minimum.
January	1867	30·260	30·50
February	„	No observation	Medl. Offr. absent.
March	„	Ditto	Ditto
April	„	30·130	29·50
May	„	30·70	29·700
June	„	29·960	29·625
July	„	30·	29·650
August	„	29·980	29·750
September	„	30·80	29·680
October	„	30·180	29·890
November	„	30·340	20·985
December	„	30·350	30·140

The Barometrical observations for the present year are as follow :-

	Maximum.	Minimum.
January	30·290	30·60
February	30·290	29·890
March	30·240	29·940
April	30·220	29·875
May	30 200	29·840
June	30·20	29·680
July	29·980	29·740
August	30·140	29·610
September	30·140	29·790
October	30·220	29·920

The average rain-fall for five years was as follows :—

January	0·73
February	0·74
March	2·25
April	11·25
May	12·8
June	20·76
July	18·77
August	14·1
September	9·84
October	8·16
November	2·4
December	0·2
	100·65

No observations of wet and dry bulb thermometer have been taken, nor of the forçe of the wind, for want of instruments.

The wind generally blows from the north-west during the months of November, December, January and February, and south-east for the rest of the year.

The observations were for the most part recorded by myself.

The past season has not differed in any respect from others.

Cholera, small-pox and fevers prevail during the cold and hot seasons, the monsoons being the healthiest time of the year. September and October, when the rains are ceasing, are unhealthy from prevalence of fevers. "

SANITATION, CONSERVANCY, &c.

1. "Comillah the sudder station of the district of Tipperah is situated on the left or western bank of a small river called the Goomtee; this

river is a shallow, insignificant stream in the dry weather, but in the monsoons it swells out into a considerable though narrow stream, being about fifty yards wide opposite the station; the water is kept in its channel by artificial *bunds*, so that during the monsoons, the station and surrounding country is below the flood level. Sometimes their embankments give way and cause inundations, as happened in September 1864 and June 1868; these two inundations did not give rise to any serious illness. The station may be divided into three parts; first, the civil station containing all the public *kutcheries* and houses of the European officials and residents; second the town; and third the suburbs. The sanitary condition of these three places is as good as can be expected in a place so situated, where paddy is cultivated in the very heart of the station and where the land is below the flood level of the river, and it is impossible to drain it effectually; notwithstanding these disadvantages the sanitary condition of the place is improved yearly, especially since the introduction of the Municipal Act.

4. *Jungle* is steadily cleared, drains kept in working order, two extensive stagnant pools have been filled up, and many smaller ones are in the course of being filled. Tanks are kept clean, great attention is paid to the burial of bodies, &c.

(*a.*) *The whole district is eminently malarious.*

(*b.*) Drinking water is obtained from tanks chiefly; those people alone use river-water for drinking who live on the banks of such streams.

The people drink water indiscriminately from tanks, rivers and marshes.

The water from tanks is wholesome; it has never been analyzed.

The supply is abundant.

The tanks are of various sizes and depths; they are liable to contamination from animal and vegetable impurities as the houses are generally built on the banks of tanks, and when this is not the case, the high banks are generally selected as burial places for the dead; owing to the lowness of the surrounding lands they are also filled with vegetation of various kinds, which when removed is allowed to rot on the edges, except in the jurisdiction of the Municipality, where it is removed.

Surface-drainage passes into the tanks.

No wells are ever used.

Tanks are only cleared out in the station; in the villages they are systematically neglected."

"Means are adopted for preserving the purity of drinking water in the station, the cleanest and best tank being set aside for that purpose, but as there are 212 tanks within the jurisdiction of the municipality, in an area of five square miles, the people drink and use the water of the tank nearest to their habitations; no bathing or washing of clothes or other noxious practice is permitted in the tank specially set aside for drinking purposes.

(*d.*) The drains at Comillah consist of narrow trenches running parallel with the roads and streets, and finally emptying themselves into a *khál*, and some into the neighbouring paddy-fields.

They vary in depth from one to six feet, and are constantly cleaned and repaired, otherwise they would be choked from the rapid growth of jungle.

They very often overflow during the monsoons. No particular results follow the overflow.

The place is not properly drained: the fault lies in the lowness of the land and the height of the adjoining river.

Well-privies are in use in Comillah, each householder having one in some part of his premises; they consist of pits three feet in depth and two feet in diameter, covered over with a small shed; they are used because sweepers who will carry away night soil are not procurable at any cost.

No public latrines are in use. Well-privies are in general use. The dry-earth system is not adopted.

Ordure is in many cases allowed to remain unburied for want of a proper class of sweepers.

(*e.*) There are very few accumulations of manure and stable-litter, and such as there are, are used up for agricultural purposes, after rotting for one year.

(*f.*) Three places are set aside for the burning of bodies, and since the introduction of the Municipality it is done carefully.

Bodies are buried generally at the depth of four feet from the surface. Three public burial places have been set apart for Mahomedans, but, notwithstanding this, almost every old inhabitant has a part of his land set apart for this purpose; many of these grave-yards have been closed, when on a careful search they were found too close to human habitations; the practice must no doubt be injurious to public health; but the custom has prevailed from time immemorial, and the people plead want of carriers; no public carriers exist, and the relatives of deceased persons in most cases are insufficient to carry the corpse any distance. The whole matter has met with careful consideration at the hands of the Municipality. In the *Mofussil*, owing to the want of high land, the practice prevails of burying bodies on the high banks of tanks, the water of which is often used for drinking and all other purposes.

(*h.*) The principal nuisance in Comillah is the tanning of leather by *Chumars*, though not on a large scale.

There are no manufactories.

Brick-making is carried on in several places, and does not seem prejudicial.

Jute is prepared in some of the tanks.

The preparation of hides is not a common trade.

(*i.*) The general atmostphere is tainted with exhalations from the large sheets of water and vegetable matter.

Unpleasant odours are perceptible at the setting in and breaking up of the monsoons, due to emanations from the soil,—resembling the odour given out by decomposing animal matter.

The poorer classes live chiefly on rice and *kesari dál* with vegetables,—seldom getting fish, and very often living for weeks on rice and salt. The diet of the latter is not sufficiently varied, and accounts for the scurvy which prevails amongst them to a great extent.

" Intemperance is common amongst the lower classes of the people, and prevails to a large extent amongst the Hill Tribes." (Collector's answer.)

Intemperance is also common among the better and respectable classes of the inhabitants of Comillah, of which fact I have come to the knowledge professionally, having had to treat many cases of enlarged liver, gastric derangements and nervous disorders, the result of intemperance.

The country liquor publicly sold is so adulterated with *dhatoora* that I consider it unfit for human consumption."

SPECIFIC DISEASES.

"Intermittent and remittent fevers are endemic in the station; no epidemics have occurred to my knowledge.

Cholera is endemic in the station and district, and sometimes assumes an epidemic form. In this station an epidemic of cholera occurs every third year according to the statements of the oldest inhabitants; my experience confirms the above, an epidemic having occurred in 1863 and in 1866.

Diarrhœa and dysentery are also endemic in the station and district, but never assume an epidemic form.

Small-pox is set up yearly, throughout the district, by the pernicious practice of inoculation, and generally assumes an epidemic form.

Hepatitis is rarely seen, except as a sequela of fevers, and sometimes in drunkards.

Leprosy, syphilis, elephantiasis, and various skin diseases also prevail."

EPIDEMICS.

"Cholera raged throughout the district of Tipperah in an epidemic form since October 1865; (an occasional case appearing in the sudder station) until the end of March 1866; when here it likewise assumed an epidemic form.

The natives date the commencement of the outbreak to the 2nd *Falgoon* or 12th February, but the few cases which occurred in February and the early and middle part of March, were merely the precursors of the epidemic which followed.

During the month of February the disease raged in an epidemic form in the villages along the Chittagong road, commencing at Chundernath or Seetakoond; in the early part of February, it came along, from village to village, until it reached the *Mohulla* of Moradpore, at the eastern extremity of the town, about the middle of the month; after carrying off a few people, it remained in abeyance until the latter end of March, when it re-appeared with fresh vigour.

From the commencement of the outbreak to the 30th April, 116 deaths have been reported.

No correct information is obtainable of the number attacked by the malady, so that the percentage of mortality to seizures cannot be given, but judging from the cases which came under my immediate observation, one half the people attacked must have died."

"Table No. 1 shews the number of deaths which occurred daily in each *Mohulla*, and from it will be seen, that out of twenty *Mohullas* into which this town is divided, seventeen suffered, and only three escaped; out of the seventeen affected *Mohullas*, that of Moradpore suffered rather severely, the fatal cases in it amounting to thirty-nine. This *Mohulla* is the dwelling place of Mahomedan *Chumars* and sweepers who set all sanitary laws at defiance, it is by far the and filthiest *Mohulla* in the whole town."

CAUSES.

The first cause to which I attribute the present outbreak is:—

I. *Weather.*—This has been unusually favourable for the development and propagation of any epidemic disease. During the months of June and July last the rain-fall was excessive, and the air in consequence damp and chilly; the whole country was inundated, looking like a vast lake; from August there has been but little rain, and the weather during the months of August, September and October was excessively hot and sultry. About the middle of November the cold weather began to set in gradually, and lasted till the beginning of February, when it began to get warm; in March and until the 18th April the heat was intense although strong southerly winds prevailed. On the 18th April a severe storm from the north-west was experienced, accompanied with rain and a good deal of thunder and lightning, and since then there have been several storms and refreshing showers of rain. The kind of weather above described is unusual for Tipperah; here the monsoon is usually prolonged till the end of October and beginning of November, when the cold weather gradually sets in and lasts till the middle of February, being followed by four or five weeks of hot weather, which ends in severe north-westers and refreshing showers of rain. The unusual weather above described gave rise to the second cause to which I attribute the outbreak, viz:

II. *Drought.*—The want of rain in the months of August, September and October caused a drought, and this has acted as an exciting cause of disease by drying up the tanks on which the entire population depend for water for drinking and all other purposes, and secondly by destroying the rice crops; the people, not having had their usual quantity of food, were weakened and rendered more liable to disease.

III. *Defective Sanitation.*—All classes of natives, as a rule, live in defiance of all sanitary laws; they have no conservancy arrangements.

IV. *Habits.*—Under this head I must enumerate—*First,* use of impure water. Tanks in native villages are never cleaned, and are used for all purposes too well known to be enumerated. *Second,* the use of open privies;

these are situated convenient to their houses, generally on the borders of drains &c.; the ordure accumulates, ferments, and gives off noxious gases, until, on the setting in of the rains, it is washed away.

Thirdly, the careless manner in which bodies are buried, in some cases within two or three feet of the dwelling house. The burning *ghât* was, until recently, situated in the heart of the town."

MEASURES ADOPTED.

"Twelve bottles of cholera mixture containing ten drops of acetic acid to each ounce, and 200 cholera pills were sent for distribution in the town to the thannah. Cholera pills were also sent to the western and northern extremities of the station for distribution in those localities.

The burning *ghât* and burial place were removed by the Municipal Commissioners, on my representation, from the heart of the town to a considerable distance down the river, though not without a great deal of opposition from the natives.

Amongst the European community only one little child was seized with the malady and recovered.

Amongst the Police four cases happened, two recovered and two died; the two fatal cases were brought in from the Mofussil in a Moribund condition.

The prisoners in the jail entirely escaped. I attribute this immunity to nothing but the excellent sanitary condition of the jail, regular meals, regular work, and the use of filtered water for drinking purposes."

SUGGESTIONS.

"The introduction of simple conservancy rules throughout the district, chiefly the setting aside of a good tank in each village for drinking purposes, and the prevention of the burial of bodies on the banks of tanks; clearing jungle, *i. e.*, low underwood; prohibition of inoculation, and introduction of vaccination; lastly, the establishment of a small dispensary at Seetakoond, where pilgrims annually resort, where cholera usually appears, and is carried by these people all over the country."

FAIRS.

"No fairs are held in this district."

VACCINATION,—INOCULATION.

"One vaccinator is allowed, whose whole time is occupied vaccinating in and around the sudder station. The numbers vaccinated increase yearly, in 1867 the total number vaccinated was 411—out of this number 373 were successful thirty-six unsucessful and two doubtful,

The people are still very much prejudiced against it.

Inoculation is practised to a great extent, and with the most lamentable results; epidemics of small-pox are annually lighted by this pernicious practice, and hundreds of lives lost.

QUARANTINE, SANITARY POLICE.

Quarantine regulations are urgently needed for the surveillance of—

I. The pilgrims who pass through this district almost every year. Simultaneously with their landing at Daoodkandy and Elliotgunge, cholera is lighted up, and causes great mortality.

II. The fair held at Moonshigunge in the neighbouring district of Dacca, ought also to be placed under surveillance, as cholera yearly appears among the people who assemble there, and is carried by them to the surrounding district.

NATIVE PRACTITIONERS.

About 200 *Kobirages* and ten or twelve *Hakeems*. I have no personal knowledge of them, but their influence amongst the people is on the decline; they are being gradually displaced by the Native Doctors.

EPIZOOTICS.

There has been great mortality amongst the cattle in certain thannahs of this district, as will be seen from the following table compiled from Police reports:—

DATE.			Thannah.	Number of deaths.	Diseases.
January	18th	1868	Thoolah	57	" Joron "
March	16th	„	Ditto	17	Ditto
April	25th	„	Ditto	96	Ditto
May	2nd	„	Ditto	15	Ditto
„	23rd	„	Ditto	126	Ditto
„	2nd	„	Daoodkandy	200	" Gootee "
„	23rd	„	Ditto	50	Ditto

"The names given though different, yet mean the same disease, the principal symptoms of which are loss of appetite, drooping of the ears, heat of the skin, swelling of the throat, inability to swallow, discharge from the nostrils, excessive thirst, often a swelling under the skin; diarrhœa closing the scene.

As this disease has been afflicting the cattle of this district for the last two years, it merits enquiry, and steps being taken in time to prevent its spread. I have recommended to the Magistrate on two occasions, the use of sulphur fumigations in the *byres* occupied by cattle affected with this disease, on the plan of Doctor Dewar of Kirkcaldy; but the people say they are willing to try the plan but are unable to obtain sulphur, the import of which has been interdicted for the last year, for reasons best known to the authorities. I have also recommended the establishment of a quarantine whenever the disease appears. On the next appearance of the disease I shall go out personally and examine its nature, &c. and report upon it."

12.—NOACOLLY.

THE SANITARY REPORT IS FURNISHED BY DOCTOR W. DURRANT, CIVIL SURGEON OF THE STATION.

Latitude 23° *North.—Longitude* 91° *East.*

"The sanitary condition of the place is said to be bad.

Fevers of all types are endemic.

Leprosy and elephantiasis are common.

The tanks are filthy, and abominations of all kinds surround them. The temperature changes suddenly every day in the cold weather, and the jungle is dense and rotting around.

Disease is most prevalent during the rains, and at the setting in of the cold weather.

The Mahomedans enjoy better health than the Hindoos.

The average number of prisoners in the jail is 252; during the year five have died.

The people generally are unhealthy, and look so. The greater portion are feeble and miserable. "There is great poverty, more the result of indolence and deficient energy than of any other cause. Those who are moderately industrious are well off, the people generally are more covetous than thrifty."

The population of Noacolly is said to be 6,000. Dr. Durrant believes this to be correct, or nearly so. The relative proportion of different sexes is unknown.

The total population of the district (taken from *Cutcherce* records) is 3,94,963. The incidence to the square mile is said to be 1,817. Exceptional mortality generally arises from cholera.

"The last visitation, accompanied by great mortality was some eight years ago."

Subsoil water is found at a depth of eight or nine feet.

The topographical features of Noacolly are of the same character as the Sunderbunds generally. Many shallow streams, stagnant marshes and extensive swamps exist.

There were no peculiarities in the past season, except the occurrence of slight shocks of earthquake.

In winter (*i. e.*, in November, December and January) the weather is foggy, cold and damp; in summer it is hot and close, sultry and oppressive.

Thermometric observations taken *in the shade* :

In December 58° lowest; in	April	94° highest
	June	94°
	July	88°
	August	91°
	September	92°
	October	89°
	November	86°

Fevers prevail in autumn and also in summer; choleraic diarrhœa in winter.

No wells are used. Tanks are numerous and filthy. Food is rather high in price. Last year the produce was above the average, sometimes the paddy crop is injured by a small worm called *Sani Pokar.*"

SANITATION, CONSERVANCY, &c.

"The station and district of Noacolly are in the worst possible condition in many respects. I don't know who is responsible. I have made a move on the subject, and have urged the importance of improving this place on the local authority, and others; but no powers exist, that I at present know of; no one seems to take an interest in the subject above noted with the exception of the Civil Surgeon. I have made proposals, but nothing has been effected. I suggest the extension of the Municipal Act, and rules for building human dwellings; tank digging; and bunding them around; and insisting upon the elevation of future buildings, like the Burmese plan, or somewhat similar.

The local circumstances inimical to health are, bad dwellings, filthy tanks, stagnant water, bad drainage and sewerage, filth and bad water, and the improper method sometimes adopted for clearing jungle and tanks leaving *debris*, weeds, &c., to lie on the banks and on the land, without burning, burying, or covering with dry fresh mould, or other means of disinfection.

The air stinks, sometimes, throughout the station—so loaded is it with decomposing products.

The water is obtained by the natives, from the nearest spot where water exists. They are not very particular. The tank which is supposed to supply pure water to the station, is polluted by washermen, and their clothes; the natives wash anything in it, and no one interferes in the matter. I attempted, but was repulsed, on the ground that I had no power to interfere. The character of the drinking water is objectionable, and ought always to be filtered through sand and charcoal.

I have sent tank water from the jail this month for analysis, to the Government Examiner, but have received no answer yet. The natives don't think much about it. But water is abundant. Some of the tanks are seven or eight feet deep, and a few are much deeper than this in medium weather. Contamination is direct, and also by percolation. The surface drainage passes into all I believe, and carries many sources of impurity into the tanks. The drains do not serve the purpose for which they were intended. There are no wells. In the jail and other hospitals, means are adopted for keeping the water pure, nowhere else in public places. Vegetation rots at the bottom and at the top of all the tanks in large quantities, excepting at the top of the jail tank reserved for drinking water.

I am not aware that *jute* is put in the water; but bamboos are; and the natives sometimes steep plantain trees in the water, saying, that they carry to the bottom deleterious particles. Probably there is gluten, and vegetable albumen freed, which sinks, taking down salts and entangling vegetable *debris* to the bottom; but I take this plan to be a very doubtful one. Carcases of animals, and human corpses are thrown into the river. From the filthy state of the dwellings, the rains carry every possible pollution into the tanks. I have known the carcase of a bullock thrown bodily into a ditch; and left there to rot in the centre of the stiaton. This I protested against."

DRAINS, CESS-PITS, LATRINES, &C.

" Drains, all choked. The water, &c., lays about stagnant, in filthy detestable black pools, except around the jail and dispensary. Depth of drains, about three feet, not clean; cleaned badly and seldom. They are obstructed and overflow. The results are fevers, splenic disease, dropsy, rheumatism, diarrhœa, dysentery, &c. These defects, could be rectified by extending the Municipal Act, appointing Health Officers subject only to the Sanitary Commissioner for the Province, in these matters with whom the Health Officer should communicate direct.

No proper cess-pits are used, a bamboo shed is supported over a drain or tank, where ordure is deposited: when the rains come and overflow the drains, the ordure goes with the water, and is scattered broadcast around. There is a road to the east side of the station, on each side of which are native dwellings in the most disgusting state, and the stench at times is so great that even the natives themselves complain that it is not remedied, and they have appealed to me on the subject; the road is at intervals impassable from these nuisances.

The tanks being near their dwellings and not bunded, of course the water is generally polluted to the highest degree. Besides, the natives deposit ordure on the surface of the ground everywhere. The dry-earth system is used in the jail only. Trenches are dug in the jail garden, and the ordure deposited, mixed with mould, and covered up with earth, and the latrines are frequently inspected. There is no conservancy system except in the matter of roads."

CREMATION AND INTERMENT OF THE DEAD.

" Burning is effected a short distance out of the station close by. I never witnessed it. Bodies are thrown into the river close by the station, sometimes fresh corpses are found imbedded in mud on banks of rivers, and on the road-side, where they are often buried by natives."

OBNOXIOUS TRADES, NUISANCES, &C.

" The chief nuisance is the want of cleanliness everywhere among the native abodes, and neglect of drains chiefly. Brick-making in the station is common, and is a great nuisance and very objectionable, as a considerable amount of carbonic acid gas is evolved in the process; and it sometimes fills the *bungalows* near, and renders the air unwholesome. I knew a man who died, although in good health, while sleeping on the top of the bricks, for warmth. On examination it was found that neither the body nor the clothes were burnt. His death was caused by the fumes of carbonic acid inhaled while asleep.

I don't think *jute* is steeped in the tanks here. With regard to hides, I have little information, but I have seen a good many drying in the streets of the bazaar."

GENERAL CLEANLINESS AND SALUBRITY, OR THE REVERSE.

"The general atmosphere is always tainted by decomposing vegetation and filth. Unpleasant odours are common, especially early in the morning and at night,—from emanations of the soil and the causes above recited, as foul air from drains, tanks, &c., &c., &c."

PERSONAL CLEANLINESS, ABLUTIONS, &C.

"The people generally are not cleanly in their habits; the majority filthy. They fail in want of regard to decency, ignorance of sanitary laws, conditions and habits necessary for health."

DIET.

"*Dâl* of all kinds, fish in abundance, yams and potatoes in small quantity, and jungly vegetables of all sorts; and the people eat raw products of these kinds frequently.

The people smoke *bhang*, Cannabis Indica, and tobacco; opium is eaten. A good deal of bad spirituous liquor is drunk; and the natives manufacture a spirit from rice, &c., and a good deal of spirit is illicitly manufactured and consumed on the islands of the Delta of the Megna; (Hateah, Sundeep, Doulut Khan, &c.) I have seen it myself.

I could not calculate with any precision to what extent these things are a cause of disease and death."

SPECIFIC DISEASES.

Endemics and Epidemics of the District.

1. FEVERS.—Intermittent is common and constant.
   Remittent and continued not so common as the above; but still prevalent.
2. CHOLERA.—Every year more or less. This year to the east and west extending twenty miles from the station; and in the station sporadic cases only.
3. DIARRHŒA.—Common.
4. DYSENTERY.—Very common.
5. SMALL-POX.—Not of late years.

6. Hepatitis.—Not very common.

Splenic and cardiac diseases, dropsies, tœnia, ænæmia, injuries from blows and wild animals, poison and murder, are all very common."

Epidemics.

" Origin.—Bad water, bad crops, raw vegetables, filth, rotting jungle, frequent alternations of temperature, as northerly and southerly winds in succession, not unfrequent.

About five years ago an epidemic broke out, supposed to originate in over-crowding of boats with pilgrims on their way to a revered mountain, in the Chittagong District.

Propagated by dirt, vice, closely crowding in miserable huts. The course is from the spot where the pilgrims do mostly congregate, and in the villages, where they halt, as in Noacolly, &c. The virulence is greater on the sides of rivers, and *bheels*.

Degree of mortality not known, but believed to be much greater than we have any idea of. Modes of treatment, by *kobirages*—very rude; very limited ideas; no notion of accurate diagnosis or prognosis; no knowledge of anatomy; (even a Native Doctor, employed in the jail here some fifteen or twenty years, could not describe the difference between small-pox and any other vesicular eruption.) Remedies used by *kobirages*, of a very powerful character; such as arsenic, antimony, opium, copper, &c. Their practice is the veriest empiricism and quackery.

Evidence of diffusion of cholera by contagion or infection, from patient to patient, I regard as obscure and uncertain. Personally, I believe cholera to be non-contagious."

Vaccination and Inoculation.

" Vaccination is not carried on in the district, and there are great difficulties in getting it systematically effected. Vaccination is practised in the jail. The greater number of prisoners have been, however, previously inoculated. The prejudices of the people have not been overcome. I should think inoculation good, where vaccination cannot be.

I think pilgrims should be subject to rule and inspection when assembled in masses.

Health of Police indifferent. Hospital and barracks bad and out of repair.

Six men died in the year of fever and its sequelæ."

NATIVE PRACTITIONERS.

"One *kobiraj* to every 2,000 inhabitants. I have met some of these. Personally I have little knowledge of them. They are ignorant in a European sense. Their influence is decreasing among the well educated. Some of their remedies are undoubtedly useful and effective; but their practice is highly empirical; and particularly in the matter of blood-letting. I saw a man bled by a *kobiraj* while the patient was, suffering from low fever, and I need hardly add that the man operated on died the following day. These *kobirajes* have no knowledge of anatomy or physiology."

13.—KOOSHTEA.

THE FOLLOWING NOTES HAVE BEEN SUPPLIED BY DR. J. G. GRANT, CIVIL MEDICAL OFFICER OF THE STATION:

" Kooshtea (Civil Station) *Latitude* 23°54′ *North.—Longitude* 89° 10′ *East.*

Tolerably healthy for Bengal.

No statistics, but the following imperfect table is compiled from the Police mortality returns, which have been systematically submitted, within the last few months only. Births and infantile mortality bearing on sex are not registered, and as the Police depend for such information on village Chowkeedars, I cannot think these returns trustworthy :—

Table compiled from Police Mortality Returns for six months ending December 1868:

MONTHS.	Total of deaths.	Average age.		Sex.		Fevers.	Cholera.	Diarrhœa.	Dysentery.	Small-pox.	Hepatitis.	Other diseases.
				Male.	Female.							
		Yr.	M.									
July	155	28	5	87	68	97	4	...	6	...	...	48
August	161	29		101	60	107	4	...	5	...	...	45
September	283	28	2	169	114	238	4	...	6	...	...	35
October	535	32		327	208	436	5	...	5	...	...	89
November	659	26	7	416	243	599	20	1	7	...	...	32
December	679	29		408	271	628	16	...	...	7	...	28
TOTAL, ...	2,472	29		1,508	964	2,105	53	1	29	7	...	277

"The prevailing diseases are of malarious origin: paroxysmal fevers and their sequelæ, general debility, spleen, diarrhœa, dysentery, and (chiefly affecting the young) *cancrum oris.* None that I know of peculiar to the place. Elephantiasis is comparatively rare, but leprosy is not uncommon; roughly estimated, the proportion of leprosy to elephantiasis is about 5 to 1."

I believe cholera, like fever, to be endemic here—due to natural conditions of soil and climate—intensified by neglected sanitation, and favored by poverty. The poor, especially those of most marshy parts, suffered earliest and most severely, without reference to caste.

I can offer no opinion on the improved healthiness, or otherwise, of the Sub-Division, but have no doubt that the salubrity of the civil station has deteriorated since the silting up of the Ganges opposite the station. There is more fever, and a greater demand for quinine.

According to the last census (1864) the total number of souls was 91,890; proportion of men, women, and children, not known.

The general population is not subject to fluctuation from emigration and is principally agricultural; about two-thirds being Mussulmen, and the remainder Hindoos."

TOPOGRAPHY, &c.

15. This Sub-Division is a plain of alluvial deposit, consisting of fine grey sand and clay, in alternate layers; covering an extent of about 297,267 acres, with a fall, favoring natural drainage, towards the south, where large *bheels,* and marshes exist. Roughly estimated, the average depth of subsoil water, during the height of the rainy season, is not more than two feet from the highest point of the station; but during the dry season the average depth at which water is found from the same point is about sixteen feet, or even more. The Sub-Division is bounded on the north by the Ganges, on the east by the Goraie, on the south by the Coomar, and on the west by the Mathabhangah, and the banks of these rivers are generally higher than the interior. The Ganges opposite to the station is liable to much alteration; *churs* are constantly forming and disappearing, and the silting up of the river opposite the station has been followed, as before stated, by increase of fevers, &c. The Goraie next to the Ganges is the largest and most active stream at this part of its course, being navigable by large vessels all the year round, whereas, the Coomar and Mathabhangah may be forded in the dry season. During the months of July and August, the central and southern parts of this Sub-Division are inundated, and communication between the villages is carried on by boats. The natural surface drainage is into *bheels,* and thence by *khâls* to the nearest rivers in a southerly direction; this drainage is in some degree interfered with by railway embankments, though culverts

are provided; moreover, the people purposely make artificial bunds to check drainage, for rice cultivation. The principal marshes are to the south of the station from five to ten miles distant, in the neighbourhood of Bhodalea, Naupara, Poradah, &c. The principal streams, liable to dry up and stagnate, are the *Dacoo* and *Poorana Goraie,* both indirectly connected with the Ganges and running southwards. The villages along their banks are certainly unhealthy.

METEOROLOGY, &C.

The following table will shew the rain-fall, noted by myself, during the year 1868:—

MONTHS.	Total rain-fall of each month.	MONTHS.	Total rain-fall of each month.
January	......	July	15·7
February	7·9	August	30·8
March	3·7	September... ...	36·3
April	......	October	0·5
May	2·2	November... ...	......
June	35·4	December	......

All other meteorological observations were submitted with the Jail Returns for the year; and of these no copies have been retained. It will be seen that the epidemic of cholera, which raged with more or less severity during the six months ending 13th May 1868, subsided after the first heavy showers of rain, which occured about the middle of May.

I have repeatedly noticed that while slight showers may arrest cholera for a time only, heavy or constant rain, tends to extinguish the disease where it is endemic. Here, as in other parts of Bengal, the porous subsoil is loaded with excrementitious matter, especially in and around villages, and along the banks of rivers, *nullahs,* &c. After the unusual inundation (during the rains of 1867) as the dry season advanced, and the subsoil water rapidly subsided, so disease showed itself—*first,* (in the months of September, October, and November) as malarious fever; and subsequently, as the subsoil water continued to sink, and the temperature to rise (in the months of February, March, and April) as cholera, which raged till apparently arrested by the constant and heavy showers, which began about the middle of May."

CROPS, &c.

"*Pucca* wells are used in every village, their water is not considered good; and its average depth (in those parts not inundated) from the surface, varies with the season, from 1 to 14 feet. There are about twelve tanks in this Sub-Division, but none are considered good. Local supplies are sufficient, food is neither cheap, nor dear. About three years ago, during the Orissa famine, food was very dear for about six months; but there was no actual famine here."

SANITATION AND CONSERVANCY, &c.

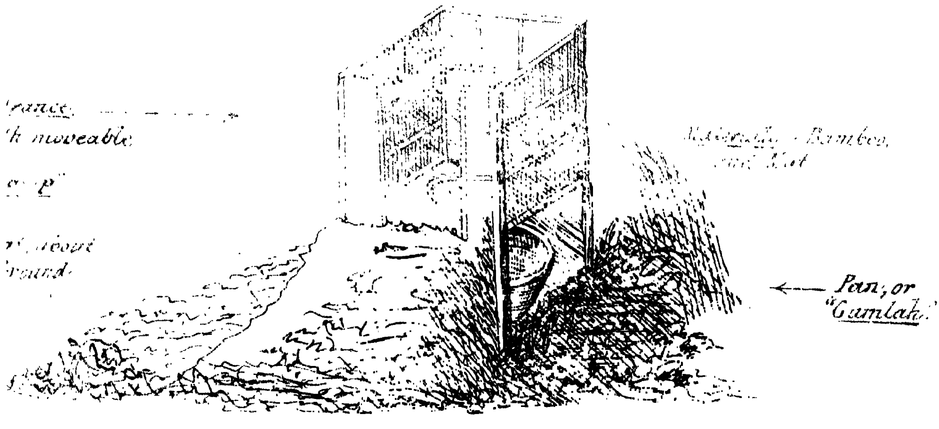
"There is no systematic conservancy; the general sanitary condition of the Sub-Division is bad. There is no Municipality, and I do not know who can be justly considered responsible for the conservancy of the place.

(*a*)—*Local causes of Malaria.*—Marshes, hollows, dug for building and other purposes, which are not filled up, and occasional stagnant ponds, imperfect drainage, rank vegetation under bamboo jungle, soil contaminated by human and other excreta;—most of these causes are invariably found, in full and combined operation, in and around every village in the Sub-Division.

(*b*)—*Water supply for drinking and cooking.*—From rivers, if within a mile, otherwise, from wells, stagnant pools, tanks, and *bheels* in which the polluted surface drainage accumulates, and in which clothes, cattle, and even pigs, are washed. I have seen *jute* steeped in water used for drinking; and during the late epidemic of cholera, till checked by the Police, the bodies of those who died of it, were being thrown by these wretched people, into the stagnant water of the *Murrá Goraie,* which *khál,* when full, supplies many villages with drinking water.

(*c*)—*Dwellings, &c.*—The interior of huts is comparatively cleaner than the filthy practices immediately outside their compounds would lead one to expect. There is no getting out of the way of bad smells, for the poor, who form the majority of every village, and especially their women, and children, never dream of going to any distance to relieve themselves, but do so in any secluded spot within a few yards of their doors. The earth on which the huts are erected, is dug from the nearest spot, without any system, the hole thus made is never filled up, except by filth, so that in due time, every hut has its corresponding cess-pit; and the well for drinking water, is most probably not many feet distant; lastly, as though to concentrate these evils, every village is enclosed and intersected by a thick jungle of bamboo, plantain trees, and rank vegetation, (through which, air and sun penetrate, just sufficiently to promote decomposition) and poisoned vapours, which hang about, or filter through these wretched places, surrounded by steamy miasmata, stagnant pools, and *excreta* in all stages of decomposition.

(*d*)—*Drains, latrines, &c.*—No system of drains. Natural drainage towards the south, and this is merely favoured by deepening existing *khâls*, or opening culverts through railway embankments &c. Public latrines, on the dry earth system, exist in the station, only where the public are prevented from polluting the road sides, but (I believe for want of funds) they are not so well provided as they should be, and *excreta* from them are not properly disposed of; they are kept tolerably clean. The poor in the district have no privies; those in better circumstances use them of this form—a pan, or well, is provided under the seat;



the pans are cleaned irregularly, and, as they are not under shelter, when it rains, their contents overflow, and the results need not be described. Except when patients' friends are warned, by the attending medical man, the *excreta* of the sick are not disposed of with any care."

(*e*)—ACCUMULATION OF FILTH, MANURE, &c.

"Manure of cows is accumulated near cow-sheds, and is used after being dried, for cooking and fumigating; but when moist, it is mixed with mud for plastering the interior of huts, or as manure for soil."

(*f*)—CREMATION, &c., OF THE DEAD.

"The wealthy burn their dead properly, but the poor throw them into the nearest river or *bheel,* even though they may know that the water is used for drinking. Mussulmans bury their dead near their own houses, and about five feet under the surface; thus every Mussulman village is habitation and graveyard in one.

Food is generally well cooked, and sufficiently varied; except among the very poor, who seldom get milk or meat, and among whom ulceration of the cornea and night blindness, are common."

(*g*)—GENERAL MODE OF LIFE.

"Nearly everything in their habits and customs, predisposes to zymotic disease."

EPIDEMICS.

"Of early epidemics there is no information; but an epidemic of cholera visited this Sub-Division during the early part of the past year (1868) it began on the 20th November 1867 at Horinarainpore, a village in the jurisdiction of Bhadalea. It has already been said that I think the disease endemic here; its rise, progress, and decline, in this instance, were associated with certain conditions of soil and season, and could not be traced to importation by pilgrims, &c.; probably its extension was ultimately favoured by human intercourse, but natural conditions of soil and season, which followed the inundation of 1867, doubtless aggravated by neglected sanitation, were I think the original causes. From Bhadalea it extended in a north-easterly direction to Bhalooka, thence, against the prevailing wind, in a westerly direction to Nowpara, and Doulutpore, where it terminated in the middle of May 1868, after heavy rain. The prevailing winds during the epidemic were westerly. The symptoms were those ordinarily observed in Asiatic Cholera. 2,778 cases were reported by the Police, of whom 1,799 died.

Sanitary instructions were circulated through the Police, who were directed to see all practicable measures carried out, and to report neglect.

Whether this was efficiently done in all instances, I am not in a position to say. Having lasted for six months it terminated in the middle of May. The disease extended in directions opposite to that of the wind, and its subsidence appeared to be coincident with heavy rain." (See Meteorology.)

SUGGESTIONS.

" Under this head one is confessedly at a loss, not for suggestions, but for such as have not been submitted already; and this feeling is in no way diminished when addressing those who are not only familiar with those suggestions, but are in a position to take a wider view of the entire subject, and its difficulties. Where everything remains to be done, and the simplest sanitary measures are unknown, by a people lacking not only knowledge and means, but the power to combine and apply them practically, I believe nothing short of efficient Government interference and aid will prove of the slightest permanent good. That the people are helpless is evident; that the majority of *zemindars,* who ought to take some interest in their *ryots,* do not assist them to combine in self help for sanitary purposes is equally evident.

I believe the people would glady submit to a fairly adjusted tax, with the object of attaining any immediate and substantial benefits which sanitary measures would yield. At present a Chowkedary Tax or subscription (as the case may be) is collected for the maintenance of Chowkedars, who are supposed among other duties to protect property, which the people can, and do protect more efficiently themselves, whereas, for that which the people cannot protect, the purity of their soil, air, and water, on which life itself depends, there is no well defined protection, no special funds exist. A code of rules, (at first, not elaborate, but embracing the most obvious and easily carried out essentials, capable of being extended into more complete measures in due time) and properly paid agents to enforce the orders of Government, appear absolutely necessary. Probably it may be expedient to improve the pay and status of the municipal force, and to extend its power to that of an efficient sanitary police, under whom, a certain number of the *dome* and *mêhtur* class, should be appointed to every village. At present many villages have none; the poor will not, or cannot support them; and as caste prejudices frequently prevent the poorest from removing filth with their own hands, they breathe or swallow it in some other form instead."

FAIRS.

" Two fairs in this Sub-Division, both either in October or November; one at Goshye Doorgapore, lasts fifteen days, during which period about 4,000 souls come and go daily: and another at Lokheekholla in Doulatpore, where about 3,000 men are said to accumulate. No facts, shewing these fairs to be causes of disease, have been brought to my notice."

VACCINATION, INOCULATION.

"In the absence of special vaccinators it is impossible to extend vaccination where the people have so strong a prejudice against it. When time and opportunity offer, the Native Doctor, goes out into the district to vaccinate; and circulars have been issued explaining the advantages of the operation, and offering it free of charge to all who desire it; but the following statement will shew with what imperfect results:—

Vaccinated.	Successful.	Unsuccessful.	Doubtful.
14	7	5	2

Inoculation is still practised; and with the imperfect isolation of those operated on, an epidemic of small-pox frequently follows: indeed, I believe the disease is annually introduced by the inoculators."

QUARANTINE AND SANITARY POLICE, &C.

"There are of course occasions (*e. g.*, epidemics of small-pox, cholera, &c.,) when quarantine efficiently carried out, would be highly desirable, and I think means for enforcing it properly, and without annoyance, should exist at all times: but under present arrangements, I do not think it can be throughly done; and failing that, it certainly degenerates into vexatious restrictions, without proportionate advantages."

INDIGENOUS DRUGS.

"Of *Rosout** I have the most favourable experience, and have found it, not only more successful, but better tolerated than quinine in many cases when that drug affects the head, without cutting short the fever. In extreme debility with relaxed bowels, by combining *Rosout* with *Biberine,* I have hitherto obtained very happy results."

EPIZOOTICS.

"The disease called *matha,* or *bushunto,* in this district, prevails during the cold season; many cows examined by myself at Poradah early last year were suffering from symptoms corresponding exactly in some cases with those of *gootee*, and in others with those of *puschima*; as described by Dr. K. McLeod of Jessore; but no additional information of importance was obtained."

14.—PUBNA.

THE FOLLOWING NOTES HAVE BEEN FURNISHED BY DR. H. M. DAVIS, CIVIL MEDICAL OFFICER.

1. " Pubna.—*Latitude* 24°8' *North.*—*Longitude* 89°15' *East.*

3. Generally healthy as a district and station.

4. Some improvement is gradually taking place in and about the stations (sudder and sub-divisional,) but many parts of the district, still covered with thick jungle, are feverish and liable to outbreaks of cholera, &c.

7. Low kinds of fever and dysentery; cholera breaking out once or twice in the year, in April and May more especially, and at the end of the rains; death rate from specific causes, very doubtful.

Leprosy and elephantiasis not so common as in many parts of Bengal.

10. There has been no exceptional sickness during the past year, exclusive of an outbreak of cholera in the station and district during the hot weather before the commencement of the rains, attributable mainly to the heat and want of common care and sanitary precautions on the part of the inhabitants.

The prisoners in jail enjoy better health than the police battalion; there are no military in Pubna; the civil population generally enjoy good health.

The ratio of sick prisoners would be about 60 per 1,000.

The ratio of Police of districts 95 per 1,000.

The ratio of mortality among the prisoners is less than one-sixth per cent. so far this year."

"The population is not subject to any great degree of fluctuation from any cause.

Population 222 to the square mile.

13. The people are generally healthy, able-bodied, industrious and thrifty, and the general health of the place, I consider, is improving."

14. *Population.*

Men	105,000
Women	132,000
Children (sex not distinguished) ..	100,679
Total ..	337,679

These figures returned by the Chowkeedars, are not very reliable. There has been no regular registration of births, &c. The population is agricultural and thriving."

TOPOGRAPHICAL CHARACTERS, &c.

"The surface drainage is carried off by *khâls,* drains and ditches, into the rivers.

A great part of the district is under water, in the months of July, August and September, to the extent of several feet.

"There is a large *jheel* the Sonaputta, four miles to the north, which has deep water all the year round and is covered with the red lily, and is a source of fever and disease. There are several other large *jheels* in the district, many miles in extent, and 8 to 20 feet in depth, supplied by rain and river water and full of reeds and jungle. These are no doubt apt to give rise to disease as they partially or wholly dry up. I am at a loss for a plan whereby this could be rectified, unless by draining them, which I fear, would in most cases, be impracticable."

METEOROLOGY, CLIMATE, &c.

"Attached is a table of mean temperature and rain-fall; barometrical records, &c., have not been kept. The observations were taken at Pubna under the supervision of the Civil Surgeon; there has been less rain, and the river has not risen high by some feet as in full floods.

Statement shewing the range of temperature and the rain-fall in the district of Pubna for 1867-68.

Months.	Mean Temperature.	Rain-fall in inches.
April	82°50	9·88
May	85°00	7·65
June	84°00	14·38
July	81°85	18·02
August	84°45	12·74
September	85°20	15·30
October	82°30	6·77
November	72°80	3 95
December	66°50	0·00
January	65°60	0 05
February	70°90	2·82
March	79°73	0·43
For the year	78°40	91·99

1868-69.

Months.	Mean Temperature.	Rain-fall in inches.
April	83°03	4·99
May	83°93	11·91
June	83°98	11 34
July	85°82	10·35
August..	83°96	17·18
September	84°48	17·20
October	81°73	00·88
November	......	......
December	......	......
January	......	......
February	......	......
March	......	......

"The climate of Pubna is cool and bracing for Eastern Bengal; during the last two and first two months of the year, in April and May hot winds occasionally blow, but of a mild nature; July, August, and September are damp and relaxing."

"The proportion of cultivated to uncultivated land in the district of Pubna is as six or seven to one.

Wells are not used for irrigation, but many *kutcha* ones exist in the town and district, with good water at a depth of 12 to 15 feet in the dry weather, and 6 to 8 or less in the rains. They are lined with earthen hoops, made and burnt in the district: the water level has not been materially altered. Tanks are not so numerous as in some other districts."

SANITATION, CONSERVANCY, &c.

"The general sanitary condition of Pubna is barely satisfactory, but the present Magistrate Mr. P. A. Humphrey is making great efforts to improve it; two conservancy carts have lately been procured to cleanse the bazaar and town, under the orders of the Municipal Committee, which is responsible for the conservancy of the place; much jungle has been cleared, and roads and drains made and improved, and real active interest is taken by members of the Committee in the subject.

Sickness and mortality might, I think, be diminished in the station and district, by filling up many small shallow tanks and holes, and cleansing and improving large ones; clearing ditches, and under-growth; thinning out trees and making each inhabitant keep the ground round his house clear of refuse and jungle.

The drainage consists of road-side ditches and small gutters cut into them; the drainage water flows into them and dries up; the drains are not very deep, and in some cases not kept clean, and are only occasionally cleaned out and repaired, (I might say seldom perhaps,) and are apt to get obstructed and overflow, causing sickness, diarrhœa and the like.

I hardly consider the place properly drained, owing in some measure to the want of a good fall, which might be somewhat rectified by giving the drains a more gradual slope from their commencement.

There are no public latrines. Private privies consist generally of a mat tied round a few bamboos, stuck in the ground, and they are simply filthy. The dry-earth system is adopted in the jail, not by the native inhabitants. Trenches are dug for the reception of the ordure from the jail; outside excrementitious matter is allowed to remain and dry up unburied. The *excreta* of sick persons are not disposed of with any special care.

"I have not noticed many great accumulations of filth, stable-litter, &c. The manure of cows is used for fuel, and there are not many other animals. Filth is not utilized in any other way.

The bodies of Hindoos are burnt pretty carefully by the river side; those of Mahomedans, &c., are buried three or four feet deep, and in many cases near the survivors' dwellings. Corpses are thrown into the rivers, often near to human habitations, as also the bodies of "Police Cases" after *post-mortem* examination."

Fairs.

One at Shazadpore in *Choit*	..	7 to 800	people.
One at Koronja in *Joysto*	..	3 to 4,000	,,
One at Koorshedpore in *Assar*	..	2 to 3,000	,,
One at Chatmohur in *Choit*	..	2 to 3,000	,,
One at Madhubpore in *Choit*	..	5 to 600	,,
One at Mothoora Ditto	..	5 to 600	,,
One at Gorolee near Station Ditto	..	2 to 3,000	,,

15.—RAMPORE BEAULEAH—RAJSHAHYE.

THE REPORT IS BY Dr. J. G. FRENCH.

"Beauleah— { *Latitude* 24°21' 8" *North.—Longitude* 88°34'3" *East.*

The district of Rajshahye extends from 24° to 25° north latitude, and between 0° to 1° east longitude of the meridian of Calcutta. The civil station of Beauleah is about 80 feet above the level of the sea.

Beauleah station is healthy during the cold and hot weather; but unhealthy, owing to the great prevalence of fever, during the rains. In March and April, however, a good deal of diarrhœa is met with. The same remarks apply to the district.

Cholera and small-pox also prevail annually. The latter being kept up by inoculators.

Leprosy and elephantiasis are rare, diarrhœa prevailed in March and does so every year when the temperature is high, and the north-west wind is blowing. Cholera prevailed from March to May 1868 (*vide* Special Report, dated 26th May, with *addenda* forwarded after the epidemic to the Sanitary Commisioner) In July, August and September a good deal of malarious fever prevailed in Beauleah, Pootea, Nattore, Lallpore, Godhagaree and in Tanore.

The natives say that it was caused by a want of inundation, and consequent non-cleansing of the drains, grounds and villages. In 1867 there was an unusually high inundation and very little fever. In 1868 there was no inundation and a good deal of fever. In 1866 there was very little of an inundation, and a bad form of fever prevailed here and in Pooteah. There is no doubt that the whole district is very dirty, jungly and malarious, and just the place where a person would expect to find a good deal of fever and spleen. Small-pox prevails in the hot weather of each year, and particularly so in Nattore, which is an overcrowded dirty native town. Inoculators then ply their vocation and the disease is extended and kept up. Although small-pox has prevailed, as I said before, in the hot weather of each year, yet there has not during the past three years been any very great epidemic of it.

In 1867 on the 15th of October, cholera first appeared in the village of Doorgapore, station Pooteah, and disappeared on the 29th of December at village Temadiee, station Lallpore. It appeared on all sides without influence from prevailing winds. Round the station of Pooteah it formed a belt without a single case occurring in the centre of the circle. From the returns there were 1,628 cases and 849 deaths. The natives attributed this outbreak to the eating of new rice and putrid fish. As the native doctors and extra compounders went round through the villages distributing medicine, and issuing instructions and sanitary recommendations, nearly every case was treated in the patient's own home, and numbers recovered.

In 1866 there were only a few cases of cholera in the Rajshahye District, and none in the jail. In 1867 there were four sporadic cases in the jail in the month of March.

Comparative Statement of health in the jail.

YEARS.	Admitted into the jail.	Released.	Remaining on 31st December.	Daily average strength.	Admitted into hospital.	Number of deaths.	Daily average number of sick.	Ratio per 1000 of sick to strength.	Ratio per 1000 of deaths to strength.	Deaths from cholera.
1866.	710	540	536	44·30	772	13	24·20	1,734·00	29·190	1
1867.	983	934	566	568·4	591	31	18·5	1,038·00	52·450	1

" Thus in the year 1867 although the strength of the prisoners increased considerably, the number of sick was considerably less than in 1866. The mortality was, however, large ; it will be referred to hereafter. March was the most unhealthly month of the whole year (1866), and it was so also in the previous years. The weather was very hot and dry with a north-westerly wind prevailing. In March 1867 there were eighty-one admissions into hospital, and of these forty were from diarrhœa alone, two from cholera and five from dysentery. The greatest number of admissions took place between the 12th and 26th of the month. One case of cholera was admitted on the 13th and another on the 14th of the same month (March 1867) ; of these one man died. The following measures were adopted to check the prevalence of bowel complaint.

(*a.*) All the articles of diet were changed, and instead of fish or flesh *duhai* or curd was daily issued. The varieties of *dâl* and vegetables were also changed. The ration of salt per man was increased; and the husking of the *dâl* and modes of cooking were carefully looked after.

(*b.*) A half meal was served out to each man early every morning before he went to work.

(*c.*) The number of prisoners in each ward was reduced by one-half, and the extra or surplus men were located in *kutcha* sheds.

(*d.*) The *hajut* prisoners were removed to a ward in the main jail, the females were placed in the *hajut* ward, and the female ward was turned into an extra hospital, where isolation and quarantine were strictly enforced.

(*e.*) Flannel belts were served out to the most delicate prisoners with instructions to wear them constantly round the abdomen.

(*f.*) Astringent pills were served out to all the sirdars of the gangs, with instructions to administer one to any man who was attacked with symptoms of diarrhœa, and then immediately to send him into hospital.

(*g.*) The water for culinary purposes was changed. River water was substituted for well and tank water. The same kind of disease and an unusual amount of sickness prevailed at the same time amongst the free population. In the jail, the admissions took place simultaneously from all gangs, wards, and different parts of the jail. And hence I came to the conclusion that the sickness depended on atmospheric influence, and particularly so as none of the measures adopted had any effect in checking it.

On the 26th of March, four cases of watery diarrhœa were admitted into hospital, but on that date at 10 P. M., a storm accompanied by thunder, lightning and rain came on, and after its occurrence there was not a single admission. The following are the months in their order of unhealthiness :

In March there were admitted into hospital			...	81 cases.
January	ditto	ditto	...	69 „
February	ditto	ditto	...	68 „
April	ditto	ditto	...	56 „
May	ditto	ditto	...	44 „
August	ditto	ditto	...	43 „
November	ditto	ditto	...	43 „
July	ditto	ditto	...	42 „
September	ditto	ditto	...	38 „
October	ditto	ditto	...	39 „
June	ditto	ditto	...	33 „
December	ditto	ditto	...	32 „

Mortality.—In 1867 there were thirty-one deaths in the jail against thirteen in the previous year. In 1867, 1,500 prisoners passed through the jail.

Comparative Statement of the health of the police force.

1866.

Daily average strength of Police Force was	..	481·75
ditto number of sick ...	...	15·166
Total number of deaths	...	12·00

1867.

Daily average strength of Police Force was	...	485·166
ditto number of sick ...	...	15·342
Total number of deaths	...	14·000

As a general rule the people of the district are able-bodied and fit for work, but very many are met with who are quite the reverse and suffer from spleen.

I cannot say whether the place is improving or deteriorating as regards the health of the inhabitants.

It is said that a census was taken in the year 1837, and the population of the whole district was then put down at 950,000 souls.

The population is now set down at 604,289. The proportion of men women and children is not known. The estimate has been made by the Police, but I do not consider the figures as at all reliable. There is no registration of births and deaths.

The incidence of the population to the square mile is said to be 253·3. The district covers 2,385 square miles. It is said that the following is the proportion of the different castes in the districts : Hindoos five-sixteenths, Mussulmans nine-sixteenths, other classes two-sixteenths. The castes are composed of *Byud, Brahmins, Koyels, Keytrets, Chamars, Khors, Mehters, Soories, &c.* The Mussulmans are divided into *Shaiks, Syuds, Moguls, and Pathans.*

In Beauleah Station the fall or slope is towards the north, and away from the river, so that when the Ganges overflows its banks and bursts through the *bunds*, the stream flows to the north and north-east. In the rainy months the sub-soil water is nearly on a level with the surface of the soil, and in some years the whole country nearly is under water. In the dry hot months of the year, the sub-soil water is generally found at a depth of ten feet from the surface.

Beauleah is situated on the left bank of the Ganges, or in other words to the north of the river. When the river rises unusually high as in 1862 and in 1867, the banks are under water, caused by the overflow of the stream; and if it were not that Beaulah is protected by a large *bund*, the whole station would be cut away. In 1867, I saw the level of the river about two or two and a half feet higher then the level of the station. Above and below Beauleah the roads were broken through, and powerful streams flowed off to the north-east and on to the *Chullun bheel.* In that year (1867) the station was converted into an island, and nearly the whole country was under water. In this year, (1868) as yet the river has not risen above its banks. Every year a good deal of silting occurs in the Ganges, and annually the course of the river is changed from the vicinity of Beauleah, to a distance of a mile and a half; but during the rains the river again rises, approaches Beauleah, and washing away the *churs* of the previous year, forms a new bed. In 1866, in the hot and cold season the stream was at a distance of about two miles from the station. In 1867, in the hot and cold weather, the stream was quite close to the station, and in the ensuing cold and hot weather it promises to be again at a considerable distance from it. When the river is at a considerable distance from us, a large white sandy *chur* intervenes, and when the south or south-east wind blows in the hot weather the station becomes very hot, and sometimes then we have very bad dust storms.

The drainage throughout the whole station and district is very bad. When there is a large quantity of water in the drains, a good deal of it flows off towards the small streams or inland rivers, making channels or drains for itself, but the greater quantity evaporates or sinks into the soil.

The natural drainage of the country is not interfered with by any altered condition of canal, or river banks, roads, embankments, railways or the like. The great obstacle to the proper drainage of the country is the want of a good fall or slope."

" Beauleah is surrounded with trees and brushwood jungle; and beyond this low-lying ground *Dhánkhatee* swamps and marshes are met with. On the south side the station is bounded by the Ganges.

All throughout the station, bazar and country, there is a good deal of rank vegetation and dirty jungle, in which leopards and other wild animals abound.

There are stagnant drains, dirty tanks and swamps to be met with in every place. The water in them generally dries up in the hot weather, and in the wet season the holes are again filled from the drains and rain water. I have no doubt that all of these dirty, jungly places are a source of malaria and of blood-poisoning to the inhabitants who live in or close to them. The remedy is obvious, and very easily applied if there were funds in hand to meet the expenses.

Every man by law ought to be made to keep his own compound and drains clean and clear.

All trees ought to be spared, and all brushwood, and low-lying jungle cut down. Drains and tanks ought to be periodically cleaned and deepened when they require it.

METEOROLOGY.

	MEAN OF	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Means for the year.
For 1866.	Thermometer	61°6	63°0	85°9	82°	85°	86°	84°	84°	81°	83°	75°	66°	78°3
	Barometer	30°27	30°14	29°89	29°78	29°11	29°57	29°58	29°60	29°62	29°79	30°15	30°12	29°80
	Rain-fall in inches ...	6	2·5	0	6·5	2·7	8·9	12·2	3·6	8·3	6·9	0	0	52·2
	Prevailing wind ...	No data	0	S.W.	0	0	0	0	0	0	0	0	0	0
For 1867.	Thermometer	62°	67°	76°2	82°20	84°19	83°26	82°67	84°	87°	72°	71°9	67°54	76°3
	Barometer	30°10	30°04	29°95	29°75	29°27	29°59	29°56	29°63	29°36	29°82	30°57	29°14	29°74
	Rain-fall in inches ...	0·1	0·2	0·4	2·70	3·50	6·0	10·7	6·20	14·10	2·70	3·4	0	50·
	Prevailing wind ...	N-E.	N.	N-W.	S-W.	S.	S-W.	S-E.	S-E.	S-E.	W.	N-E.	N-E.	N.
For 1868.	Thermometer	64°6	68°71	76°08	83°1	85°7	85°3	85°45	85°12					
	Barometer	29°14	29°99	29°87	29°84	29°81	29°58	29°65	29°61					
	Rain-fall in inches ...	0·02	3·4	3·0	3·10	9·25	14·45	13·2	10·75	Total 57·17.				
	Prevailing wind ...	N-W.	N-W.	N-W.	S-W.	S-E.	S-E.	S.	S-W.					

" Previous to 1866 the mean monthly temperature was 76°25. In 1868 it was 78°3 and in 1867 it was 76°6. In Beauleah the hot season is from March to the end of May, during which time the Thermometer ranges from 75° to 100° F. In March the winds change to the south, and west, attended with great heat during the day, and dew at night. In this month also the equinoctial squalls prevail, sometimes attended with thunder, lighting and rain, but at other times quite dry, and dusty. In May the weather is very close and sultry. The rainy season commences in June and continues to the end of September, and during this time, which is generally cool, the Thermometer ranges from 70° to 80°.

The observations have been taken by the Civil Surgeon and Native Doctors. The figures for 1867 are reliable, but I cannot speak for those of previous years, my information is derived from the Meteorological Register Book.

In May and June 1868 there was an unusual rain-fall, but the same thing happened all over Bengal."

IRRIGATION, CROPS, WELLS, &c.

" In Rajshahye District about 1,699 square miles are cultivated; 606 uncultivated and 80 are barren; about half of the area is under rice cultivation; the remainder is taken up with indigo, mulberry, and barren or waste land. The proportion of irrigated to unirrigated is not known, Irrigation is carried on by drains, channels, streams and rivers, wells are not used for this purpose; tanks are very numerous, and some very fine ones are to be found in the district.

The station tanks are generally filled each year from the river Ganges by conducting the water through sluice gates in the *bund* and in drains. Tanks so filled generally are clean and contain pure water."

SANITATION, CONSERVANCY, &c.

".I am sorry to say that I cannot give a good account of the sanitation or conservancy of Rajshahye or of its chief town and civil station, Beauleah.

Extensive jungle, closed-up dirty drains, dirty tanks containing foul water, odours of the most unpleasant nature on all sides, from the absence of conservancy and from the filthy habits of the natives, and polluted rivers and streams render the sanitary condition of Beauleah, and of the whole district of Rajshahye generally, most objectionable."

" Municipalities, under Act XX of 1856, exist at Beauleah and Nattore. Any surplus from the tax is applied by the Magistrate to conservancy purposes, but it is very seldom that there is any surplus. The great want is money.

The Magistrate is responsible for the sanitation and conservancy of the place, but no real active interest is taken in the subject.

Holes are dug to supply earth for the annual repairs of the *bunds,* and these, on the first rains, become filled with water and remain for months foul pools and stagnant reservoirs of filth. These defects have been annually reported on, but no improvements have lately been effected ; as stated before, the remedy for all these defects is obvious, and very easily applied, if only there were funds in hand to carry out the object in view. By the passing of a Sanitation Act, which would make every house and landholder keep his own compound, drains, and latrines clean and in order, the sanitation of towns and villages, and also of whole districts would be at once improved. Fines for neglect would supply the Health Officers with the means of clearing away jungle and brushwood, cleaning tanks and drains, filling up holes and cess-pools, and for providing clean drinking water by keeping the source of supply free from impurities.

These measures, owing to the great prevalence of fever and of spleen are urgently required in Rajshahye. From the amount of broken ground, the number of hollows not filled up, the stagnant pools, high grass, bushes, underwood, trees not thinned, jungles not cleared" and "imperfect perflation of air, I consider Beauleah, and the whole of Rajshahye malarious, and particularly during August, September and October, very unhealthy. No forest trees, as far as I am aware, have been cut down, but where such exist they are quite choked up with brushwood and thick low-lying jungle.

Running water is preferred by the natives, but they generally take that which is close at hand, be it from rivers, lakes, *jheels,* wells, or tanks. The principal rivers in Rajshahye are the Ganges or *Pudda,* Burral, Godye, Goor, Mohanunda, Jumoona, and Barangee. The Burral is dry or very shallow for half of the year, but all the others are navigable running streams. *Lakes.*—The *Chollun bheel* in Rajshahye is the largest in Bengal, and is said to be forty-five miles in circumference. There are also the *Coomari, Halti, Chunderbatti* and *Churye Bheels.* The water in large *jheels* or lakes is thought to be good, and particularly so if a river or stream runs through them. Wells (of which there are very few) and tanks, unless they be attended to, generally contain foul stagnant water, which, in many instances, is rendered still more impure by receiving the contents of foul drains, or the accumulated filth of many individuals who daily resort to such places for bathing and washing. The water of such places is freely partaken of by the people around for both drinking and culinary purposes. The European residents in Beauleah generally use the Ganges water, which after boiling and filtration is considered good. The water has never been analyzed. I have known a whole village full of people daily use the offensive water of a tank in which *jute* had been steeped over and over again. Most of these people suffered from fever, but this disease was very prevalent at the time all over the district. Cattle and human beings alike bathe and wallow in the tanks from which drinking water is procured. The same water is also used for washing clothes, and no care (except in the jail) is ever taken to keep the tanks clean or free from impurities.

In the jail one large tank is kept exclusively for drinking and culinary purposes. No prisoners are allowed to bathe or wash in it, no drains run into it, and it is enclosed by a railing. Into the river Ganges, just above the *Burra kotie* and bazar, the butchers throw the offal and carcases of the animals they kill. These are great sources of impurity, but they exist all over the district and wherever a river or tank is to be found.

Cleanliness, ventilation, and light are all alike disregarded. Even in the fine large *pucka* houses which the wealthy *zemindars* build, and on which they expend vast sums of money, it is surprising how totally they ignore the common laws of health, and the principles of sanitation, although such are well known to them. In these also no provision (I mean suitable or adequate) is made for light or ventilation. Everything is sacrificed to security and privacy. Spoon-drains (*kutcha*) run along the sides of the roads or the compounds of the *bungalows*. There is no plan followed out and the drains all vary as to depth, direction, cleanliness, &c. In the rains they overflow, and in the dry weather they are choked with jungle. No proper drainage exists in any place.

Cess-pits or " well privies" or public latrines do not exist. The latter are (with very many other things) very much required. The dry-earth system is carefully carried out in the jail, and in the charitable dispensary, and in these places the soil is buried in trenches. In no other locality is such attended to; and the *excreta* of sick persons is not disposed of with any special care.

Accumulations of stable manure exist for some months, but in the cold weather they are generally made use of for gardens and lands. Cow's manure is made use of for fuel, and is quickly disposed of in consequence. All other accumulations of refuse matter are generally left to rot and to disappear of themselves, it being nobody's business to remove them. Filth is not utilized in any way. Bodies are burned on the banks of the river without any care or regard. In like manner the bodies of Mussulmans are interred close to human habitations, but the fear of jackals and of dogs obliges the relatives to bury the body to a depth of 5 or 6 feet from the surface; corpses of the very poor or of those who are not known or are unclaimed, are thrown into the river, but not close to human habitations.

The slaughtering places are quite close to, or surrounded by the dwellings of the people. These places are on the river-bank, above the station bazaar, so that they pollute the water which is used by the inhabitants. Lower down, the carcases and offal are thrown into the stream.

Brick-making is carried out in the jail garden which is in the very centre of the civil station. Jute is not steeped in the station tanks, but is so in the *jheels* in the district.

In the hot weather, in very many parts of the station, the atmosphere is quite tainted; and most unpleasant odours from feculent matter lying on the ground, all around, or from foul drains and sewers, are perceptible.

The people are in the habit (common all over Bengal) of squatting down for the purposes of nature in any spot close to their houses, and of making water without any regard to decency or health. From this cause the air in some places is very foul, and the water of the small tanks or drains, close by, is filthy and stinking.

SPECIFIC DISEASES.

Intermittent and remittent fevers prevail throughout the whole twelve months, but in some years and at certain seasons of the year these fevers are very common.

It has been mentioned that a very bad form of fever (low remittent) prevailed in and near Dooteah, at the end of the rainy season, in 1866. It was (as far as I can find out) something like an epidemic, and many persons died. The year 1867 was free from anything like an unusual prevalence of malarious fever, but in July and up to date in 1868, a very bad form of fever prevailed all over the district of Rajshahye; Europeans and natives were alike attacked. The type was remittent, in some cases high, and in others attended with low symptoms and great prostration. A good many of the natives died of the fever. The symptoms generally showed a good deal of malarial poisoning in each case. The fever is referred to before, but since that was written it became much more extensive and widely spread, and I myself was prostrated by it, and was obliged to leave on medical certificate. This circumstance unfortunately prevented my making further observations or gaining additional information about it.

Cholera.—Some particulars of the cholera which prevailed in 1867 have been already given. A detailed report (dated 26th May 1868) of the epidemic which prevailed in the jail was forwarded to the Sanitary Commissioner, and a copy of the same to the Inspector General of Jails, Lower Provinces, was published by Government in the Supplement to the *Calcutta Gazette* (No. 40 of 23rd September 1868) and consequently there is now no occasion for me to re-enter into the subject.

Diarrhœa.—Prevails annually in March and April; this subject has been before touched upon.

Dysentery.—Is common at all seasons of the year, but the worst cases and most are met with at the commencement of the cold season, and particularly in debilitated individuals or in those who have previously suffered much from malarious fevers.

Hepatitis.—Is rare, I have only seen a few cases of it in a year and a half.

Fairs.—Fairs are held twice a week or oftener; sometimes in almost every village in Rajshahye. The great *mêlas* are at Khetore in *Ashin* (September) at Manda in *Choitro* (March) and at Bagha (a Mussulman town) during the *Eed.* The average number of persons at these fairs varies from 3,000 to 5,000.

Cholera.—Is sometimes brought by the pilgrims; I only once observed this, and the reasons for my coming to this conclusion have been already given in my cholera report, or *Addenda* to the cholera report, before alluded to. The natives say that fairs are the means of propagating cholera.

VACCINATION.

Vaccination is carried on under me in the dispensaries of Beauleah and Nattore. There are also native vaccinators under the Superintendent of Vaccination (Doctor T. Mathew) but I know nothing of their operations. In 1866 there were under me 3,255 successful cases, 95 unsuccessful and 25 doubtful. Total 3,375.

In 1867 there were 1,560 successful cases, 94 unsuccessful and 32 doubtful; Total 1,686. Close to the towns the villagers and people are generally anxious to have their children vaccinated, but they will take no trouble about the matter, hence, the vaccinator is obliged to go round and vaccinate in the houses. Throughout the district generally, the people prefer inoculation, and will not have vaccination. The former is most generally carried on.

I think quarantine is called for, when the pilgrims are passing through Beauleah, and this I enforced in 1868. I have not had sufficient experience as yet of the subject, and therefore cannot offer an opinion as to whether such measures are futile or useful.

There are numbers of native doctors, Calcutta unpassed students, *boids,* *kobirajes* and *hakeems* in the district. Each Rajah, or wealthy *zemindar* keeps his own native doctor. One of these men is I hear an L. M. of the Calcutta University, but all of the others are unpassed students, and dismissed compounders, who having got a smattering of medical knowledge, and obtained a slight knowledge of compounding, think themselves qualified to treat any disease. That most of their patients die, is not to be wondered at, but death is always attributed to the intensity of the poison, or to the severity of the disease, or to the hand of God, rather than to the action of the prescriber's drugs. I have treated many cases which had been previously treated by these men, and have lost some of my own patients by the energetic working of a dose given by the family *kobiraje.* The *kobiraje* uses arsenic, mercury, Indian hemp, ghee from goats milk, and many secret herbs; they place great faith in diet, and prescribe regular courses without being able to tell the mode of action of a single ingredient."

The following note was appended to Doctor French's Report, which was written on board the Steam Ship *Candia* passing up the Red Sea:

" This report I am sorry to say, was three times interrupted by severe illness. Most of it has been written on board ship, on my way to Europe on medical certificate, and far away from my books and other sources of information; hence, I regret it is not as it should be. Were it not that I am particularly anxious to give all the information I possess, after my one year and nine months' residence in Beauleah, I should have left the task to my successor. These explanations will I hope be sufficient to account for very many short-comings."

16.—MALDAH.

THE REPORT IS FROM BABOO U. C. KASTOGREE, CIVIL MEDICAL OFFICER.

Maldah is situated betwen 24° 31′ 50″ and 25° 28′ 30″ *North Latitude* and between 87° 48′ 30″ and 88° 33′ 30″ *East Longitude.*

3. "Maldah is healthier than the districts around it, such as Purneah, Dinagepore, Rungpore, Rajshahye and Rajmehal. It may even be considered as one of the best districts in Bengal, for healthiness.

Nevertheless its sanitary condition is not what one would wish it to be to entitle its being called a safe place for human habitation.

4. Comparing the present condition of Maldah to the past, when it bore the name of Gour, and was the capital of Bengal, under its Hindoo and Mahomedan rulers, its sanitary condition though not the very best, was at any rate much better than what it is now, with its extensive tracts of *jungle,* and marshy *jheels,* filled with dead vegetable organic substances, in the various stages of decomposition. After the Hindoos, the Mahomedans becoming the rulers of the land, their governors neglected its sanitation entirely, and in 1560, a plague broke out in Gour, and hundreds of people fell victims to it; even the governor himself did not escape.

The place was then deserted entirely, and the seat of Government removed.

Jungle then began to grow everywhere, and its beautiful *digees,* or artificial lakes, with their clear and transparent waters, became gradually filled up with vegetable growths. The condition of the place is now so deplorable, that even the old palace, still with some magnificent remains of its old edifices overgrown with *jungle,* has become the abode of tigers, wolves, and other ferocious beasts, and its artificial lakes, have become marshy *jheels,* and the refuge of fierce alligators.

The present English town of Maldah, situated ten miles to the north of the old palace of Gour, but still within the suburbs of that ancient city, cannot therefore be healthy, having thick *jungle,* and marshy *jheels* on every side.

10. There has not been any exceptional sickness during last year, except from epidemic cholera, the particulars of which will be given in the proper place.

Both leprosy, and elephantiasis are rare.

Acute rheumatism is rare in this part of Bengal; but as the result of syphilis very common. The disease generally attacks the large joints of the extremities, and cripples the patient for life.

11. Disease is more general after the rains, when the waters begin to dry up; hence November, December and January, are the most sickly months

in the year. The diseases which break out at that period are malarious fevers of a more virulent type, dysentery and cholera.

The same is the rule in the surrounding districts. In the districts of Dinagepore, and Purneah, however, a virulent type of fever is said to be endemic throughout the year. It is a popular belief, and not altogether unfounded, that cholera is rare in Dinagepore; at any rate the disease is not seen to rage epidemically in the English station there, according to the assertions of certain respectable natives of Dinagepore with whom I had opportunities of conversing on the subject.

The jail and the police battalion of Maldah, did not suffer much from any great sickness or mortality during the last year; but the civil population of the whole district being attacked with fever and cholera, which broke out on the drying up of the waters after the subsidence of the inundation of the Ganges, great numbers died away.

In the jail in 1867, the daily average number of sick was ...	4·80
Ratio (per 1000) of sick to strength ...	80·297
Ditto ditto mortality to strength ...	7·191
In the Reserve Police Force the daily average number of sick...	7·604
Ratio (per 1,000) of sick to strength ...	21·87
Ditto ditto mortality to strength ...	1·67

12. Generally the poorer classes of the people, and those who neglect the laws of health, suffer mostly from diseases; such as those who live in low damp houses, eat the most unwholesome food, drink unclean waters, and by their avocations, are exposed to sudden changes of temperature. As a rule, the lower orders of Mussulmans are more unclean and irregular than the same class of Hindoos, and in cases of unusual sickness, therefore, such as in epidemic fever or cholera, the former suffer comparatively more.

Referring to cholera, one fact is worthy of notice, viz. that Hindoo widows who live on vegetable food during their whole lives, and eat one meal a day, very rarely get cholera. At least I have not seen a case in my practice of the last twelve years.

Maldah is not improving as regards the health of the natives, and unless old Gour be thoroughly reclaimed, the chances of the place gradually deteriorating more and more, are very great.

14. The present population of Maldah cannot be ascertained. According to the census taken in 1852, the population is 237,490. The proportion of males, females and children has not been ascertained. According to race, the population was divided as follows:—Hindoos, 1,87,450; Mussulmans,

50,000, Europeans 40. I cannot ascertain to what extent these figures are reliable, and on what data they are based."

Estimating the area of the whole district at 1,288 square miles, the population to each square mile is 184·30."

PHYSICAL CHARACTERS.

" According to the assertion of the Assessor of the License Tax, whose avocations called him to every part of the district, half of the area is covered with *jungle*. *Jheels*, as I have said before, are many, and have the effect of making the country unhealthy for the greater part of the year.

The sub-soil water is found at the average depth of 20 feet.

The beds of the rivers are about 12 to 18 feet below the level of the country during the hot weather. Although silting occurs in them, it is not to such an extent as to cause alteration in their course year by year; hence it does not affect the natural drainage, and is therefore not a cause of disease. No silting of the Ganges occurs on its eastern or Maldah side.

As stated before, in inundations of the Ganges, the whole district of Maldah remains under water. During the inundation of the last year, the country was for four months from July to October under water.

Situated in the vicinity of old Gour, which is now an extensive tract of *jungle*, containing rank vegetation and marshy *jheels*, nothing is wanting to make Maldah unhealthy.

All the rivers of Maldah during the rains swell to the size of more than half a mile in breadth, gradually dry up, and during the hot weather become so narrow as hardly to measure more than 100 yards across ; these rivers therefore leave a sand-bank on one side or the other, which to all intents and purposes affect the localities in the same way, in causing diseases, as swamps would, in other places. The average depth of the river at this time is hardly more than fifteen feet.

The sanitary measures by which I would propose to make this district healthy, are :—1st, the *jungle* should be cut down as much as possible and set fire to. 2nd, the stagnant pools of water, wherever existing, should be put in communication with the nearest running stream, by cutting canals ; and paddy of a certain species, which grows in deep waters, should be sown in them, at the commencement of the rains. 3rd, the low river-banks should be utilized by sowing mulberry, or indigo, as is now done in certain parts of the country only. In short, the old city of Gour, which, as I have said before, is an extensive tract of *jungle* land with numerous marshy *jheels*, ought to be thoroughly reclaimed, before the climate of Maldah can be improved."

METEOROLOGY AND CLIMATE.

The available meteorological statistics for 1867-68 up to date, are given in the following tabular form :

MONTHS.	1867.				1868.				1867.	1868.
	THERMOMETER.			Rain-fall.	THERMOMETER.			Rain-fall.	PREVAILING WIND.	PREVAILING WIND.
	Max.	Med.	Min.		Max.	Med.	Min.			
	°	°	°		°	°	°			
January	68	60	52	55 in.	85	68·85	52	·05 in.	Westerly ...	Westerly.
February	80	67	54	·10	86	62·3	56	1·75	North-West.	North-West.
March	85	70·25	60	·825	94	86·54	62	·05	West ...	West.
April	95	79·29	64	·15	110	·82	71	1·4	East ...	East.
May	96	83·3	70	2·55	101	·78	75	3·5	East ...	South-East.
June	93	80·5	75	4·225	102	·80	79	7·20	South-East...	South-East.
July	87	81·41	77	11·25	96	·81	80	6·65	South-East ..	South-East.
August	87	81·7	78	11·25	90	·82	80	15·21	East ...	South-East.
September	87	79·3	78	18·15	89	·79	78	8·55	East ...	South-East.
October	83	74·67	71	1·5	86	83·19	74	·1	North-West.	North-West.
November	79	68·3	60	1·117	...	......	...	......	North-West.	....
December	85	75·87	52	·05	...	......	...	......	North-West.	....
Total	...	......	...	51·667	...	......	...	44·55		

The mean average temperature and rain-fall for 1864-65 and 1866, are as follows :

MONTHS.	Temperature.			Rain-fall.			REMARKS.
	1864.	1865.	1866.	1864.	1865.	1866.	
January	56°	60°	61°	·6	......	·2	
February	61	65	62	·8	3·5°	·7	
March	69½	72	80	......	1·71	1·5	
April	78½	78	78	......	7·72	16·10	
May	78	78½	80	2·72	7·72	10·	
June	82	78	85	9·32	1·34	10·9	
July	82	85	85	12·8	20·9	9·6	
August	79	79	82	11·4	......	10·2	
September	78	76	82	17·41	3·78	10·43	
October	70	75	78	·45	......	2·	
November	63	61	61	......	......	1·5	
December	53	62	53	......	3·11	......	
Total	......	......	......	55·50	49·78	73·13	

The observations were formerly taken in the jail hospital of Maldah at 9 A. M. and 3 P. M., by the jail native doctor. From about three months ago, I myself take the observations in the charitable dispensary.

No peculiarities were noticeable in the past season, beyond the somewhat scanty fall of rain in comparison with the year preceding. The wind during the rains invariably blew from south-east.

The climate of Maldah is not like that of other places in Lower Bengal. Situated on the extreme limit of the north tropic, the heat of summer, and the cold of winter, are both comparatively great; for, furthest from the Bay of Bengal, it does not possess the advantage of a cooling sea-breeze, to counteract the effect of the excessive heat of the summer; on the other hand, the piercing cold wind from the north-westerly direction, without any counteracting hot breeze from the direction of the equator, makes its winter much more severe than in the districts in Lower Bengal.

Irrigation is not much practised; and nearly half the land in the district lies waste and covered with *jungle* or water.

The average depth of the water in wells, from the surface, is about 24 feet during the hot season, and 15 feet during autumn and winter. During the rains the water level is 5 or 6 feet below the surface, and often within the hand's reach.

The wells, as regards construction, are temporary (*kutcha*); consequently in two or three years, they generally fill up by earth falling in from around during the rains; and, becoming dry, require to be dug up again in the hot weather.

Tanks are not numerous, but the few that are seen, are very large, and said to have been dug by the Hindoo governors of Gour. They are mostly found in or about the ruins of that ancient city.

Food is on the whole cheap. The produce of the past year was below the average of former years. No disease of crops is known to the people here, but they say that at certain times and places, a species of insect destroys the paddy and some other crops."

SANITATION, CONSERVANCY, &c.

" The sanitary condition of Maldah Sudder station is not what it ought to be. There is no proper drainage in the native quarter of the station. The filth and refuse of every private dwelling are collected in certain parts of each compound, and on one side of the lane or pathway, behind or in front of the house, and there allowed to lie, and putrefy. The lanes are generally low, mostly *kutcha,* and quite impassable during the rains.

The well water is very unwholesome, has an unpleasant mineral taste, and is a fruitful source of disease among those who use it for drinking or culinary purposes.

The existing state of the conservancy is the worst imaginable. Privies' are either cess-pits, or small spots of ground with *pucca* or *kutcha* enclosures, where human ordure, urine, and the water used for washing, are all allowed to putrefy together for days, or months. No *mehters* are generally engaged, or, if engaged, they finish their work by covering the rotten mass with a layer of earth or of ashes, over which another putrefactive mass gradually accumulates, to be treated in the same way again. There are two native *bazars* in the sudder station where people assemble to sell and buy fish and vegetables. Here rotten refuse of vegetables and fish are generally allowed to accumulate for days, and when one has occasion to pass through them, the sickening stench, evolved from the mixed organic substances in various stages of decomposition, is unbearable.

The district officer is responsible for the sanitation, and conservancy of the place. I am not aware if any one takes any real active interest in the matter. Once during the last year, I verbally brought to the notice of the Magistrate, the deplorable state of the native quarter of the station and of the *bazars,* but nothing, as far as I am aware, has been done to improve their sanitary conditions.

The sanitary improvements which would decrease sickness, and mortality in Maldah, are as follows :—

In the sudder station (English Bazar) and the old towwnship of Maldah situated on the other side of the river Mohanundah) :—

1st. The lane or pathway between every two rows of native houses should be made higher, with *pucka* surface drains on either side. These should be made to communicate with the main drains which empty into the river.

2nd. Every private compound should also have its own drains to communicate with the main drains, or their feeders.

3rd. Privies in private compounds should be made in such a style as to admit of their being cleaned daily, and every occupant of a private dwelling should be compelled to engage *mehters* to clean them daily. Where a district municipality exists, the dry earth system of conservancy should be enforced, under its immediate supervision.

4th. For the poorer classes of the residents, public latrines on the dry-earth system should be constructed; and the system carried out and supervised by the District Municipal Committee, the expenses being met by the funds collected under the District Municipal and Conservancy Act.

5th. Strict rules should be laid down and enforced, for keeping cattle at a distance from the dwelling houses, and also for keeping the cattle-houses clean, and having the excrement removed, or otherwise utilized as manure.

6th. One great cause of sickness, and mortality in these stations is the dampness and utter want of ventilation, in the low brick-built native houses.

In 1866 I had a small quantity of the river and well water analysed by Dr. Macnamara who wrote to me as follows:

"Sir,—I have examined the specimens of river and well water sent by you for the purpose. Both are very hard and contain much lime and magnesia in addition to much alkaline chlorides, sulphates and carbonates; both too contain much nitric acid. The well water contains rather more of all the abovementioned constituents than the river-water, I should say of both specimens that they contain more inorganic matter than a good potable water should. As regards the organic matter it is not possible to determine this, by the ordinary process of combination in the presence of so much nitric acid, and the chameleon test cannot be satisfactorily applied unless upon the spot, to sufficiently fresh water."

The natives themselves consider the river water wholesome.

The well water "though clean and transparent, is far from being agreeable to the taste; it has a brackish mineral taste, and people using it, commonly suffer from dyspepsia. Bathing in well water is said to cause certain diseases of the skin especially ringworm. Certain wells in the vicinity of privies and burial grounds become contaminated with animal impurities by percolation.

Around tanks there are generally *kutcha* drains, out of repair since first opened, and not answering the purposes they are intended for. Wells are, as a rule, not protected by gratings or any other covering."

"Wells and tanks are scarcely ever cleaned.

I am not aware if any means are adopted for preserving the purity of the water. Plenty of decayed leaves are to be found on the surface of tanks and wells which are close to trees, and these not being removed, gradually decompose and sink to the bottom.

When the river is close, people prefer bathing in it; otherwise they bathe in the tank or well,—generally at the same *ghât*, where water is drawn for drinking or culinary purposes.

Clothes are generally washed in the same place, and cattle are allowed to bathe and wallow in the water.

Carcases of animals are generally thrown into the river, rarely buried under the earth. Drinking water, therefore, becomes unclean by some one or more of the various sources of pollution above stated.

The principal roads, such as the one leading from the court to the jail, and a few others, are metalled and clean, but those in the native quarters are *kutcha*, and during the rains mostly impassable.

The average number of inmates in each dwelling or house, 15 by 9 feet, having 135 superficial feet of space, or 810 cubic feet of air, would be between four or five, taking the husband and wife and two or three children; and considering that a large quantity of household articles are generally stowed in the corners, and suspended from the walls, on all sides, these houses must be very much overcrowded.

Cattle, and in the case of Mussulmans, poultry-houses also, which are built quite close to the dwelling houses, add ten times to their uncleanliness.

The depth of the drains when originally made, cannot now be ascertained, they are not kept clean regularly, and hence have filled up in places, and rarely answer the purpose they are intended for. Such drains cannot but overflow after any heavy shower of rain, and, by thus making the surrounding ground soft and muddy, cause disease in the locality.

I do not consider the sudder station properly drained. The defect lies in the embankment, which is placed on the east, to prevent the submersion of the station from the overflowing of the river during the rains, to rectify this evil, I would suggest a number of under-ground drains being opened at intervals, all along the *bund*, having valvular doors on the river-side, so constructed and placed, as to allow free exit of water from the station, but at the same time prevent the river water from getting in through them."

"Cess-pits or well privies are pretty commonly made in the native quarters. Their construction is the same as that of *kutcha* wells without the earthen hoops; the tops covered with planks, with a round or square hole in the middle, answering for defœcation. Over some, small thatched houses are built to prevent the rain-water filling them up. A well privy is dug in a certain part of the compound pretty close to the dwelling-house. It is not excavated quite up to the water level, never cleaned, but allowed to fill up gradually by accumulated ordure, urine, and the water used for washing; and when these come to a certain level, say within two or three feet of the surface, which generally takes some years, they are either covered up entirely with earth or with the rubbish of the house, and new ones dug up in other parts of the compound.

(*e*.) I have seen many accumulations of filth, manure, cow-dung and refuse matter in the native quarter of this station. They are not removed at stated periods.

The interment of dead bodies of Christians is effected in the graveyard, which is very close to the hospital and to human habitations. Mussulmans have their own burial grounds.

Mussulmans bury their dead at the depth of 3 to 3½ feet from the surface.

I am not aware of any fact bearing on neglect in the cremation, or burial of the dead in Maldah.

(*g*.) There is only one place, where the slaughter of animals is effected, and that is in the heart of the station, within a few yards of the government charitable hospital and dispensary, and twice that distance from the court house. A number of native houses are only separated from it by a street running between. There is a ditch close behind the slaugther house. The offal of the slaughter-yard is thrown into the ditch, to be gradually decomposed, or eaten up by dogs and vultures.

This slaughter-house is a great nuisance in the locality, especially to the inmates of the hospital, in which direction the wind blows from it for certain months in the year, and as it has a most deleterious influence on their debilitated constitutions, it should be removed to some open and safer place, as I have recommended to the district officer.

(*h*.) The only obnoxious manufactory I am aware of, is the making of silk from the silk-worm. During that part of the process which consists in boiling the cocoon for disentangling the silk from it, a nauseating animal smell is evolved which I think is noxious in its effect."

(*i.*) GENERAL CLEANLINESS AND SALUBRITY.

"The atmosphere of the sudder station and the old township of Maldah is tainted with emanations from neglected drains and sewers. An unpleasant odour is generally perceptible when passing through lanes in the native quarter. That arising from the boiled cocoon is very sickening, and perceptible in those villages or places only where silk is manufactured."

(*l.*) GENERAL MODE OF LIFE.

"The habit among the up-country people of taking one heavy meal a day, and starving for the remaining hours, is I think pernicious to their health. The custom among the Hindoos generally of fasting on festival days, and eating raw grain soaked in water, and green fruits afterwards, is also a fruitful source of bowel complaints, especially diarrhœa and dysentery, and, under epidemic influences, it becomes a predisposing cause of cholera. Pilgrims at *mélas* and travellers on the way, generally eat parched rice, soaked in water, or curded milk, and treacle, with which a large quantity of particles of dust, floating in the air, are usually mixed. This is one principal source of disease in such places.

That intemperance in spirits and intoxicating drugs is a common vice in this district, will be clear from the fact that a sum nearly equal to one-third of the whole revenue of the district is annually collected by government, from the *abkaree* revenue alone. More opium, however, than fermented liquor is used by the people. The evils which have their origin in the former are premature old age, dyspepsia, diarrhœa, and dysentery. To the latter are to be attributed diseases of the liver and kidney. I consider the liquor fermented from rice and treacle, and prepared in the common distillery, less pernicious to the health of the people, than brandy and rum, as the former is generally weak, and sold in shops still more diluted with water."

SPECIAL DISEASES.

1 *Fever.*—" Intermittent, and remittent fevers are common in this district. The latter is however more common than the former.

From the time I have taken charge of this station in November 1866, I have not seen a case of small-pox in the sudder station. Reports reached me in April last of the disease breaking out among the people of a certain village in the sub-division Gojole, to the north-east of the sudder station, after the *kobirajes* had inoculated a number of children there, and then the disease spread to the north-west as far as Khusbah Division, and south-east as far as Gomastapoor. Cholera, in a mild form, was also raging in those places, and the native doctors who were deputed for treatment, submitted their reports afterwards, from which it appeared, that in Gojole alone, 222 cases of small-pox were treated by the native doctor from 25th April to 19th June, of whom twenty died. The native doctor deputed to Gomastapoor, treated eleven cases from 8th May to 28th June, of whom one was reported to have died. From the above it will appear that the attacks, though numerous, were mild in character, as the small percentage of deaths to the number treated shows.

5. *Hepatitis.* —This, as the result of ague, is common, but as an original acute affection is rare in this district, its termination in abscess is therefore rare. Chronic enlargement of the liver, by the obstruction to the venous circulation giving rise to dropsy, is a more common sequela. The hot season is favorable for the production of hepatic diseases; but the season when malaria is rife here, leads to its chronic enlargement.

6. Venereal disease from its universal prevalence in the sudder station requires to be especially noticed here. The number of public prostitutes equals the number of male inhabitants, and certainly exceeds the male sojourners of the place, and the morality of the people is so far degraded, that few persons, bachelor or married, can be found, who have not suffered from one or more attacks of the disease in their life time.

I cannot suggest a better sanitary measure, as its remedy, than establishing a lock hospital and putting in force the Contagious Diseases Act."

EPIDEMICS.

"The epidemic cholera which broke out in Maldah in October 1867, and which did not entirely cease until June last, formed the subject of a separate report which I submitted to the Medical Department, on the 23rd July last.

The inundation of the Ganges during the rains of 1867, laid the whole district of Maldah under water from July to September 1867. The water commenced to dry up in October, when both cholera and fever broke out simultaneously in different parts of the district.

The fever was of a malarious nature; a large number of persons were attacked by it, but they generally recovered. It had not the virulence of epidemic fever as elsewhere, and medicines were served out, as reports reached me. I shall, therefore, not detail on this subject but confine my remarks to cholera.

The first outbreak was at Kolleachouk, a sub-division of Maldah, close on the Ganges, which was the longest under water during the inundation; numbers died before the local Police sent their reports on the 19th November 1867, and medicines were immediately despatched, with written directions for use, to the care of the Sub-Inspector."

"On the 20th the Sub-Inspectors of Gore Goreebah twenty-eight miles to the north of the sudder station, and of Bholahut and Gomastapore six and twenty miles respectively to the south and south-east, also sent in their reports of the outbreak of cholera in their Sub-Divisions, and medicines as before were sent to them.

On the 30th the Sub-Inspector of Khusbah, thirty-six miles to the north, sent his report and asked for medicines, which were supplied.

In the 4th week of December, Newabgunge, thirty miles to the south-east, was affected with the epidemic. Medicines as usual were sent there also.

In the sudder station, scattered cases of cholera occurred from October 1867 to June 1868. On the 27th December 1867, and for three or four days following, attacks were very numerous. In the charitable dispensary, only forty-six persons applied for relief, of whom thirty-one were cured, and eight died, and the remaining ceased to attend; sixty-four cases of choleraic diarrhœa were also treated, of whom thirty-five were cured, and the remaining ceased to attend.

In the jail four cases of regular Asiatic Cholera occurred, and these ended fatally. There were besides twenty-two cases, which being cured either in the first or second stage, were recorded as cases of choleraic diarrhœa. All these attacks took place from February to June 1868.

Towards the end of February, the disease much abated in the district stations, and no fresh reports were therefore received.

In the last week of March, cholera, of a more virulent type, broke out at Kansaut, twenty miles to the south of the sudder station, close to the banks of the Ganges. This outbreak is to be attributed to the Baronee *mêlah,* which took place there on the 25th March 1868, when there was a large gathering of men from Dinagepore, Rungpore and Purneah, besides those of Maldah. The *mêlah* broke up in two days on account of the numbers dying there, but this only caused the scattering of the disease all over the district, and it may be said without exaggeration, that very few villages in the whole district escaped without losing some lives. At Kansaut, however, the disease took a firm footing, and numbers were daily carried off. A native doctor was deputed with medicines on the 1st April, and the treatment there, and in contiguous places, continued down to 22nd May; weekly reports were sent by the native doctor, and the numbers who came under his treatment, taking also cases of choleraic diarrhœa, were seventy-five, of whom sixty were reported cured, eleven died, and four ceased to attend."

"The second place where the disease raged most fearfully was Gojole; here the mortality for a short time was so great, that dead bodies of persons returning from Kansaut Fair lay along the road side, and the villagers commenced to run away. An extra native doctor was sent there. His operations extended over a short period of ten days, from the 4th to the 13th April, and only twenty persons took medicine from him, of whom fourteen were cured and six died. After this the disease abated, and the native doctor was called away.

I should have mentioned before, that, in consequence of a fair which took place at Parooah, twelve miles to the north of the station towards the end of January 1868, the disease received a fresh impetus in the villages to the north and east; of the two convicts who were attacked in the jail in February, the first was a newly convicted man from a village close to Parooah, and very probably he brought the disease into the jail.

A third outbreak of cholera commenced to rage in the north and east of the district before the second had entirely died away; this may be attributed to the great fair at Magmurdun in the district of Dinagepore about seventy-two miles from here.

It is, I believe, the opinion of one or two gentlemen in this division, that Magmurdun fair is an exception in the category of those which are generally said to give rise to epidemic diseases, especially cholera. The precedent of the last fair, however, does not warrant my subscribing to the same opinion. I have heard some Maldah shop-keepers, who went to the fair, assert to the contrary. I made especial enquiry from one Domun Baboo, a *zemindar* of Maldah, who also went to Magmurdun to purchase elephants. He informed me, that in the *mèlah* he himself got an attack of choleraic diarrhœa from which he recovered by taking some medicine which he had with him. Further he said that the *mèlah* commenced on the 11th April corresponding to the *Churruck-poojah* day, and cholera broke out on the day following; that in one spot alone he counted twelve dead bodies. The people were panic-struck, and although the *mèlah* was to have lasted a week, it commenced to break up on the second day, and within a few hours, out of nearly a lac of people said to have been gathered there, a few hundreds were only left. He roughly calculates the total number of deaths in the *mèlah* to be between 200 and 250.

"The effect of the outbreak at Magmurdun was soon felt in the district of Maldah, and Sub-Division Gojole was the first to suffer from it. The native doctor sent there treated forty-three cases, of whom thirty-four were reported cured, six died, and three ceased to attend."

" In the first week of May, cholera again appeared in the Sub-Division Gomastapore, and the native doctor sent there treated forty cases (including cases of choleraic diarrhœa) and cured thirty-three.

In the above account I have given the origin and dates of appearances of cholera in different places.

One fact is certain, viz., when the disease attacks a locality in a bad state of sanitation, it sticks to it the longest, and is often got rid of with great difficulty. In this station there are two localities named Mugdompore and English Bazaar. The former is comparatively an open place, thinly peopled, having houses generally built of straw and bamboo, and roads and lanes pretty clean. The other is close; very thickly peopled; houses mostly made of Gour bricks, very low, and utterly wanting in ventilation; roads and lanes badly metalled; private compounds brick-laid; the drains nearly filled up with filth, and heaps of refuse; organic matter in almost every compound in different stages of putrefaction. Nevertheless, cholera generally breaks out first, and with virulence, in Mugdompore. The English Bazaar often escapes a visitation entirely; on the other hand the disease ceases in Mugdompore first, whereas, in the other place, the disease once appearing, takes a firm footing, and is not easily got rid of.

More males than females,—more of the labouring classes working in the field, eating worse kinds of food than persons in affluent circumstances and working within doors, eating good and easily digestible food,—more of lower than of higher castes or professions,—and more adults than children suffer from cholera.

The extent of sickness was great, as very few villages escaped from its ravages. Mortality was also very great, though no statistical record is available on this head.

In a few cases I have passed galvanic currents through the heart and spine, with great relief. In one particular case the patient willingly took the shock continually for a few hours, after which his body became warm, and the pulse returned to the wrist.

The choleraic discharges being very contagious, it is a safe precaution to mix them with charcoal or lime properly, before letting them be thrown away.

The precautionary measures for preventing or mitigating the evil are, use of good digestible food and water; keeping the house perfectly clean;

residing in dry and perfectly ventilated houses; avoiding overcrowding; and if possible, removing from the affected locality.

"I consider small doses of quinine and camphor taken daily in a time of epidemic visitation of the disease to be a good prophylactic. *Disinfectants* especially carbolic acid, would be useful in every dwelling house. If possible every man ought to keep a little of it in a phial near him.

"Last year the disease prevailed, on and off, from October 1867 to the setting in of the rains in June 1868, after which it subsided. When cholera visits a station, where it did not appear at least for some years before, it does not leave the place without visiting it successively at least for three years, and then again disappears for some years.

The disease is very rare during the rains when the country is under water, and it is remarkable that it invariably breaks out when the waters begin to subside. This regularity in its appearance, however, is not to be seen in thickly populated places, such as Calcutta and Dacca, where, from its power of contagion, the disease cannot be entirely exterminated, and acquires an endemic nature. The disease thus breaking out, as if from a peculiar exhalation from the earth, may remain dormant under peculiar local circumstances and sanitary conditions, and re-appear again under more favorable conditions."

FAIRS.

"There are five principal fairs held in this district: *viz.*, at Parooah in November, pilgrims 5 to 6,000; at Ramkael in June, pilgrims 30,000 to 33,000; at Toolsee Behar in *Maugh*, pilgrims 3 to 4,000; at Kooric in April, pilgrims 12 to 14,000; and at Kansaut on the Baronee festival day in March, pilgrims 8 to 10,000.

I consider all these fairs to be sources of disease, where people sojourn for days, for reasons which I have stated when speaking of the Magmurdun Fair, held in the district of Dinagepore last year. On this subject I suggest certain sanitary measures for mitigating the evil.

1. The local authorities should have power to prevent *mélas* being held in notoriously unhealthy places, and in consultation with the Medical officer, should select a suitable place; for which purpose an elevated place, open in every direction, at a good distance from marshes or swamps would be appropriated."

2. "In the fair itself, all dealers and shopholders should have their places arranged in rows, leaving twenty feet of space or passage between every two rows.

3. A separate place at least 100 yards off, should be allotted for cooking purposes; and another place 200 yards off from the latter, to be used as a privy; for this purpose females should have a separate place.

4. *Mehters* should be engaged to keep these places clean, as also the place where the principal fair is held. To meet these expenses, a toll may be levied on the articles sold in the fair.

5. Another place on the leeward side (referring to the direction of the wind) of the fair, and at a good distance from the latter should be allotted for beasts of burden and other live stock, brought there for sale and other purposes.

6. Every shop-keeper should be bound to erect a hut for his temporary abode; care should be taken that these huts are built at good distances, say at least ten feet from each other and in a line; people in good circumstances, who are not shop-keepers should make similar provisions for their temporary sojourn, or the authorities should undertake to erect huts, and make them reside in them—paying a certain rental. The poorer classes should also be provided with huts *gratis*.

7. All the unwholesome articles of food, such for example as *dahee* (curded milk) mixed generally with dust; *churah* (parched rice); *suttoo* (flour of certain species of pulse, eaten raw by the up-country people); treacle, and green fruits, such as the water-melons, gherkins, pumpkins, &c., which are generally eaten in fairs in place of cooked food, should be prohibited to be eaten there.

8. To preserve the purity of the water, tanks should be selected near *mélas* from which people must drink the water; regular guards should be placed over them, to prevent the water being spoiled by bathing or washing."

VACCINATION—INOCULATION.

"No vaccinator being allowed for Maldah, the few vaccine operations performed are confined to the civil station, and are performed either by myself or by my hospital assistants."

" The annual vaccine return of the last year is as follows :-

Months.	Successful.	Unsuccessful.	Doubtful.	Total.	Months.	Successful.	Unsuccessful.	Doubtful.	Total.
January 1867 ...	5	1	...	6	July 1867 ...	...	...	...	...
February „ ...	1	4	...	5	August „ ...	...	...	...	...
March „ ...	3	...	...	3	September „ ...	...	...	...	...
April „ ...	...	...	...	...	October „ ...	...	...	...	...
May „ ...	1	...	...	1	November „ ...	...	...	...	...
June „ ...	1	...	...	1	December „ ...	9	...	...	9

Quarantine, Sanitary Police.

" Regarding cholera, as I have said before, as having its primary origin in the soil, and secondary origin in infected people, quarantine, though not altogether futile, would fail in thoroughly preventing fresh outbreaks in places which are favorable for its generation."

Native Practitioners.

" On an average a *boid* or *kobiraj* will be found in every village in this district.

People residing in the sudder station, and who have been treated either in the government dispensary or elsewhere in the English method, rarely call *Kobirajes* again. Their influences may therefore be said to be decreasing. In the interior, faith in *kobirajes* is as paramount as ever.

With the exception of arsenic in fever, and a few preparations of mercury in syphilis, the *kobirajes* use few chemical substances as medicines. Their remedies are almost entirely derived from the vegetable kingdom, growing indigenous in the country. With these, and principally by starvation, they plan out the cures of their patients suffering with fever, and they often do succeed in curing simple cases.

Acute attacks of dysentery are often well managed by the *kobirajes,* old tamarind, milk, whey, plantains, rice-gruel, fresh juices of certain plants, such as that of the bark of the *koorchee* (Wrightia Anti-dysenterica) &c., comprise their medicines for this disease."

Epizootics.

" I have not heard of any disease of cattle in this district."

17.—RUNGPORE.

THE REPORT IS FURNISHED BY DR. H. C. BOWSER, THE CIVIL SURGEON.

Rungpore.— *Latitude* 25° 42' 8" *North.—Longtitude* 89° 11' 4" *East.*

The place is said to be particularly unhealthy for the lower and poorer classes of the population, who are badly housed and fed, but Dr. Bowser does not consider it "at all an unhealthy place as far as the better classes of society are concerned."

"The rate of mortality especially from fevers is very great."

The complications are spleen and bronchocele.

Leprosy and elephantiasis are rare.

The year 1868 was not unusually unhealthy, but the place cannot be said to be improving in healthiness.

Dr. Bowser writes: "In thousands of cases of *post-mortem* examinations, I have always found the spleen larger than the normal size." As a rule the people suffer from their infancy from enlarged spleen.

"The health of the prisoners, as compared with the outside population, is remarkably better. The health of the Police Force, from the fact of their being well housed and constantly shifted from one part of the district to another, is better than that of the general public. Rungpore is not an unhealthy place, as far as the European residents are concerned; in fact, during several months of the year, *viz.*, from November to June, inclusive, I consider it healthier than most districts in Lower Bengal."

The incidence of population to the square mile is 285·7.

"The sub-soil moisture is found at a depth, on an average, of ten feet."

METEOROLOGY, CLIMATE, &c.

The meteorological observations have been very imperfectly kept by a native doctor, and therefore are not worth giving as they cannot be relied on.

The climate of Rungpore is cooler than most places in Lower Bengal. From November to June it is extremely healthy, from which time fever (the common disease of the district) begins, being most rife about the end of the rains and of October."

"Tanks are very numerous.

Food is on the whole cheap. The produce of the last year was an average one. .No blight of crops has been known in Rungpore for ages."

SANITATION, CONSERVANCY, &c.

"The sanitation of Rungpore is as bad as it can possibly be; in fact there is no attempt at it. No municipality exists. From my knowledge of the better classes of inhabitants, I am of opinion that much interest could be awakened among them on this point. A municipal commission is much needed.

A meeting of the inhabitants was lately held on the subject of improving the sanitary condition of the civil station of Rungpore, at which meeting it was proposed to convert the extensive *jheel*—which is the hot bed of malaria, and which bounds the station on its northern aspect—into a deep running stream, which is believed to be practicable, by turning a small stream into it from a river close by, and allowing it to drain itself into another river, which it now does when very full during the height of the rainy season. There is the old bed of a river at the southern aspect of the station, which during the rains becomes converted into a *jheel*, and in the dry season dries, and becomes thickly overgrown with rank vegetation. It was proposed to dig large deep tanks at intervals along this channel, which would serve to fill up the surrounding country, and would in themselves be clean deep reservoirs of water. The station is too thickly wooded and squatted over by natives of a low class, whose dwellings and grounds are kept in a filthy state. It was proposed to clear the superfluous wood, and to remove all native huts outside a certain radius. I, as Secretary to the Committee, suggested the above, and it was carried unanimously. The Committee are awaiting the opinion of the Superintending Engineer of the circle, as to the feasibility of these undertakings, that officer having been instructed by Government to inquire into the matter.

I consider the district of Rungpore exceedingly malarious.

The dwellings of the people are kept clean enough internally, but outside they are surrounded with filth and garbage and jungle of every description. They are not, as a rule, overcrowded, but they are very ill-ventilated."

" There is always a permanant heap of manure and refuse at every door-way."

WATER FOR DRINKING AND CULINARY PURPOSES.

" The inhabitants of Rungpore drink water and use the same for culinary purposes from any and every source, from rivers, tanks, wells, *jheels*, swamps and marshes, and even from any little hole containing a few bucketsfull of collected rain-water, the drainings of the country. The water has never been analyzed by myself, (nor by others to my knowledge,) but I consider it very unwholesome; it is saturated with vegetable impurities, which are visible to the naked eye; the natives themselves consider the water bad; the supply is abundant.

The grounds in the immediate vicinity of tanks and wells are, as a rule, covered with jungle, and in the case of tanks, up even to the water's edge. The surface of most tanks is covered with green, slimy vegetation, and wells for the most part, from being dug under trees, have a lot of decaying leaves in them. The natives ease themselves in the immediate neighbourhood of tanks and wells, and wash themselves after in the tanks, and a good deal of percolation besides takes place from domestic washings of every kind, which are indiscriminately thrown about in the immediate vicinity of tanks.

Surface drainings of every possible kind pass into tanks.

Wells, as a rule, are surrounded by bamboo fences."

The source of water supply is never systematically cleaned out. It is defiled in every way, by the bathing of cattle, the burrowing of pigs, the steeping of jute, &c. Dr. Bowser considers it extremely unwholesome.

CREMATION AND INTERMENT OF THE DEAD.

" This is as bad as it can be. The poorer class of Hindoos seldom burn their dead, but throw the bodies into the nearest ditch or pool of water, often by the side of public highways, or in the immediate outskirts of villages; while the Mahomedan population scratch shallow graves two or three feet deep, and bury their dead frequently at their very door-steps in the midst of villages. There is no regular place set apart for burial purposes."

SLAUGHTER OF ANIMALS AND DISPOSAL OF THEIR CARCASES.

" There is no special place set apart for the slaughter of animals, but this is done anywhere most convenient, often at the very door-way of dwellings, and the offal is simply thrown out at the back of the house, if indeed it is removed at all."

Obnoxious Trades, Nuisances, &c.—" There are not many obnoxious trades carried on in the district of Rungpore, except it be the general soaking of jute, which is done in any and every pool of water which can be found. The preparation of hides is not a common trade. Brick-making is carried on all over the district, which procleaves large excavations, which in the rainy season become converted into miniature *jheels*."

General cleanliness, salubrity or the reverse.—" I consider the atmosphere to be highly tainted with the products both of decaying animal and vegetable matters. Unpleasant smells are rife everywhere, and these are due to the general uncleanliness of human habitations; the soaking of jute and the decaying of vegetable matters in *jheels,* tanks and ponds."

Personal cleanliness, ablution, &c.—" As far as bathing is concerned, the inhabitants are clean, but with regard to clothing or other matters, they are extremely filthy. Religion demands the ablution of the person daily, which is done in the first convenient pond of water, but the same clothes are resumed which are simply reeking in filth and abomination of every description."

Diet.—" The ordinary diet of the poorer classes, the mass of the people, consists of coarse rice, with a pinch of salt and a chilli, varied occasionally with a curry prepared of leaves and roots gleaned from the jungles surrounding the houses. Animal food is a rarity seldom indulged in, the usual diet is not varied, I do not consider it sufficient, and certainly consider it anything but wholesome. The food is not well cooked."

UNWHOLESOME LIQUORS.

" Intemperance is scarcely known among the general class of the inhabitants."

EPIDEMICS.

" I have seen no epidemics during my two years residence in Rungpore."

FAIRS.

"No large fairs are held in the district of Rungpore."

VACCINATION, INOCULATION.

"Vaccine operations are entirely under the Superintendent of the Darjeeling Circle. It is practised to a small extent. The people do not object to it, but lean more to inoculation as an older institution. Inoculation is carried on to a very large extent in the district."

QUARANTINE, SANITARY POLICE.

"Quarantine is not called for, for I am given to understand that epidemics are almost unknown in the district of Rungpore."

NATIVE PRACTITIONERS.

"The name of *boids, kobirajes* and *hakims* in the district of Rungpore, is legion, every second or third person one meets is a *kobiraj*, and I need scarcely remark that, under such circumstances, the generality are impostors."

18.—JULPIGOREE.

THE REPORT IS BY DR. KENNETH McLEOD.

"Julpigoree.—*Latitude* 26° 32′ 20″ *North.—Longitude* 88° 45′ 37″ *East.*

The District of Julpigoree only came into existence as such, on the 1st of January 1869. It is composed of the whole of the old Western Dooars District, and of the two Pergunnahs of Bykuntpore and Boda, which formerly belonged to the Rungpore District. Julpigoree, which was up to the 31st December 1868 a military station, and a sub-divisional out-station of the Rungpore District, is now the sudder station of the district of the same name, and the head-quarters of the Commissioner of the Cooch-Behar Division; the station has, therefore, become an important one as a civil station. This report will more immediately concern the station of Julpigoree, but information will also be given, as far as it has been gathered, about the new district.

Decidedly healthy—The condition of Julpigoree cannot be said either to have deteriorated or improved; no data exist on which to found a precise answer, but such is the opinion of Colonel Haughton, an experienced officer and shrewd observer, to whom I am greatly indebted for much of what follows:

Abstract from the Dispensary Returns of 1867-68.

	JULPIGOREE.			TITALYAH.			BODA.	GRAND TOTAL.	PER CENTAGE OF TOTALS.	REMARKS.
	1867.	1868.	Total.	1867.	1868.	Total.	1868.			
Fever, Intermittent ...	326	284	610	570	432	1,002	303	1,915	29·	The Boda Dispensary was opened on 10th July 1868.
Ditto, Remittent ...	48	69	117	20	17	37	7	161	2.	
Diarrhœa	19	49	68	28	45	73	13	154	2·	
Dysentery	15	60	75	39	40	79	27	181	3·	
Rheumatism... ...	33	39	72	60	27	87	48	207	3·	
Syphilis, Gonorrhœa ...	96	69	165	40	41	81	36	282	4·	
Cholera	0	4	4	6	6	12	8	24	4·	
Small-pox	0	0	0	1	0	1	0	1	·01	
Spleen disease ...	49	81	130	74	63	137	81	348	6·	
Bronchocele... ...	15	8	23	5	7	12	5	40	·59	
Bronchitis and Asthma...	50	84	134	26	69	95	29	258	·4	
Skin diseases ...	104	46	150	155	149	304	118	572	·9	
Ulcers and Abscesses .	60	53	113	41	51	92	31	236	39·	
Other causes ...	347	511	858	484	428	912	392	2,162	33·	
Total ...	1,162	1,357	2,519	1,549	1,375	2,924	1,098	6,541	100	

"No diseases are peculiar to this locality. Bronchocele is rather common; cases of leprosy and elephantiasis are met with, but not in any remarkable number. Towards the hills, the natives suffer from the bites of an insect called the *pipsa* which causes small ulcers. The medical officer of the 41st Native Infantry at Buxa, writes me that a considerable number of the sepoys of that regiment have been incapacitated from duty, temporarily, from that cause. I don't know the species of insect. Bites and injuries of tigers, pigs, rhinoceros, though hardly falling under the head of disease, are very common here.

There has been no exceptional sickness in 1868.

The district participates in the nature of the rest of Lower Bengal in the prevalence of fevers, mainly at the breaking up of the rains; and of bowel complaints and eruptive diseases, during the hot water. In the cold weather, with a high range of temperature, and cold nights, dysentery is very common. Rheumatic affections are said to be worse during the hot weather. This may be owing to the great range of temperature, amounting frequently to 30°.

I can get no satisfactory account of the health of the Police. They are scattered about the district, and a register only kept of the sick at head quarters, a fraction of the total sick. In 1868 the daily average sick was about 30 in a force of 300, and the Sub-Assistant Surgeon in charge gives only one death for the whole force. The following table illustrates the health of the 6th Bengal Light Infantry in 1867and 1868, I don't give 1866 because the men carried with them into Julpigoree many relics of the Bhootan campaign, in the form of scurvy, fevers, and, impaired constitutions:—

Statistics of the 6th Bengal Light Infantry for 1867-68, *contrasted.*

1867.	1868.
Strength (II) present 517 (II) absent 78 (III) Total 595	(I) 562 (II) 80 (III) 642
Admission 800	879
Admission, present of strength (II) per annum 154·7...	156·4
Deaths (I) in hospital 7 (II) elsewhere 6 ...	(II) 6 (II) 3
Deaths per cent. of strength (I) 1,351 (II) 7,692 (III) 2,185.	(I) 1,067 (II) 3·75 (III) 1,402
Deaths, average sick 25, constant sick per cent 4·8	32·6 5·8
Average No. of days lost by each 17 ...	21

Classes and orders of Diseases.	No. of admissions 1867.	Admissions per cent of		No. of admissions 1868.	Monthly.	Daily.	Admissions per cent to total admissions.	Monthly.	Daily.	Admissions per cent of strength (I.)	Monthly.	Daily.	Deaths 1867.	Deaths 1868.
		Total sick.	Strength (I.)											
(*a*.) Fevers ...	272	34·0	52·6	325	53	...	36·9	2·9	...	57·8	5·2	...	1	...
(*b*.) Bowel complaints...	77	9·6	14·9	106	29	...	12·1	2·5	...	18·9	4·0	...	...	1
(*c*.) Rheumatic affections	20	2·5	3·9	27	7	...	3·1	·6	...	4·8	1·9	...	...	1
(*d*.) Other miasmatic ...	32	4·0	6·1	17	...	15	2·4	...	1·6	3·0	...	3·1	...	...
1. Total miasmatic ...	401	50·1	77·5	475	74	...	54·5	4·4	...	84·5	7·0	...	...	...
2. Enthetic	25	3·1	4·9	21	...	4	1·9	...	1·2	3·7	...	1·2	1	...
3. Dietic	11	1·4	2·1	15	4	...	1·7	·3	..	2·7	·6	...	...	...
4. Parasitic	83	10·4	16·1	96	13	...	10·9	·5	...	17·1	1·0	...	1	...
I. Total Zymotic ...	520	65·0	100·6	607	87	...	69·0	4·0	...	108·0	8·4	...	...	...
II. Constitutional disease	1	·1	·2	3	2	...	·3	·2	...	·5	·3	...	...	...
1. Nervous disease ...	15	1·9	2·9	31	16	...	3·5	1·6	...	5·5	1·6	...	...	...
2. Chest	12	1·5	2·4	15	3	...	1·7	·2	...	2·7	·3	...	...	1
3. Stomach	29	3·6	5·6	30	7	...	4·1	·5	...	6·5	·9	...	2	2
4. Urinary	...	...	...	2	2	...	·2	·2	...	·3	·3	...	...	...
5. Genital	3	·4	·5	2	...	...	·2	...	·2	·3	...	·2	...	...
6. Muscular... ...	1	·1	1·2	3	2	...	·3	·2	...	·5	·3	...	...	...
7. Skin	59	7·4	11·4	71	12	...	8·1	·7	...	12·7	1·3	...	...	...
II. Total, Local ...	119	14·9	23·0	160	41	...	18·1	3·2	...	28·5	5·5	...	...	...
IV. Developmental ...	40	5·0	7·7	6	...	34	·8	...	4·2	1·1	...	6·6	...	...
V. Violent	120	15·0	23·0	103	...	17	11·8	...	3·2	18·3	...	4·7	2	...

"It must be borne in mind that these figures refer to up-country natives, and that the regiment had, previous to coming into Julpigoree, been through the Bhootan campaign.

The place appears to be stationary as regards salubrity.

The population is said to be about 304,000. The number of males and females is unknown. The figure given above was obtained some years ago by the Collector of Rungpore, and may be taken as pretty near the truth.

There is no registration except by the Police chowkedars, and this is not to be depended on.

The incidence of population may be stated as 140 persons to a square mile."

" The district forms part of the belt of the Terai; all the districts north and north-west of Julpigoree may be called Terai. It is a broad strip of country traversed by numerous rivers and streams.

The country approaching the mountains is very devoid of water during the dry season, and people in some places have to travel ten miles for water. The smaller rivers often pass for many miles under ground, and then re-appear; the beds which they traverse during the rains remaining to mark their course. Owing to the hard stony nature of the sub-soil wells are impracticable. In the plains distant from the hills, the sub-soil, is entirely gravel or sand, or a mixture of the two, through which water percolates in all directions. True clay is not found in the district.

There is a considerable southerly " fall " in the whole district. From the foot of the hills to Julpigoree, distant thirty-six miles, the difference of level is 1,000 feet. To the west the slope is more gradual, and the difference of level in the distance not more than 700 feet and imperceptible to the eye. The difference in altitude between Julpigoree and Cooch-Behar, to the south-east, distance fifty-five miles, is estimated over 600 feet. There is thus, a well marked slope for natural drainage, and stagnation of water is impossible. The district is drained into the Ganges on one side, and the Brahmapootra on the other.

Water is found in the dry months at from twelve to fifteen feet from the surface. In the rains it is almost level with the surface.

The broad clean Teesta, across which the easterly breeze, so common at all times of the year, blows, is considered a barrier against malaria and is, thought to deprive the wind of its pernicious properties."

There are no canals in the district. The banks of the rivers are as a rule higher than the surrounding country. They are generally raised some five or six feet above the average rain level."

Julpigoree is higher than the flood level of the Teesta. The rivers in the district are constantly changing their course, but this is not considered a cause of disease.

The surface drainage is carried off mostly by infiltration through the soil and gradual drainage below the surface into the rivers.

The country is partially under water during the rains in July, August and September; the surplus water is, however, rapidly carried off when the rains cease, and the lodgment of water is a very rare circumstance."

" Julpigoree is on a clean open sandy plain on the banks of the Teesta. There are no swamps, marshes, low-lying ground, &c., in its immediate vicinity. To the north and east there are the great jungle-tracts of the Terai, but the station is separated from these by the rivers, and a cultivated area beyond.

Stagnant *nullahs, bheels,* &c., are very rare throughout the district, they are however seen to the south of it."

METEOROLOGY, CLIMATE, &c.

" The only reliable observations available are those for 1867 and 1868. The observations for 1867 are tolerably reliable and complete; those for 1868, are less complete and more doubtful.

1*st.—The thermometrical observations for the years in question are as follows* :

	1867.			1868.		
	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.
January	79°	56°	67·5	76°	48°	62°
February	84°	61°	71	78°	50°	64°
March	89°	66°	80·5	89°	56°	72·5
April	95°	67°	82	94°	61°	77·5
May	98°	71°	88	91°	70°	80·5
June	99°	75°	83	94°	72°	83·
July	90°	75°	83	90°	71°	80·5
August	92°	77°	80	93°	71°	82
September... ...	98°	72°	84·5	91°	70°	80·5
October	86°	64°	73·5	89°	65°	77·
November... ...	92°	73°	81	88°	63°	70·5
December... ...	78°	61°	69·5	75°	47°	61
The year ...	99°	56°	78·6	94°	47°	74°2

The mean of the two years is 76·4."

2nd.—The monthly range of the two years is:—

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1867... ...	23	23	23	27	23	24	15	15	26	22	19	17
1868... ...	28	28	33	33	21	22	19	22	21	24	35	28
Average ...	25·5	25·5	28	30	22	23	17	18·5	23·5	23	27	22·5

The range of the thermometer is thus very considerable over the whole year. It is greatest in March and April, and least in July and August. These figures are probably approximate, but certainly not thoroughly accurate.

No reliable barometrical observations are available. The instrument from which readings have been obtained for the last two years is an Aneroid, whose indications are certainly higher than they ought to be. Were this instrument adjusted to a standard mercurial barometer, its readings might be relied on.

3rd.—Hygrometrical records for 1867 *are as follow*:

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Mean deduced dew point ...	61·2	61	66	75·5	77	78	78·6	78·6	79·6	79·6	71·5	62·8
Mean degree of humidity ...	54	43	45	72	64	85	76	76	72	72	63	54

The records for 1868, are unreliable.

4th.—The rain-fall of the two years is as follows :

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1867	...	1	4	4	7	24	26	25	8	7	2·5	...	108·5
1868	...	3	4	10	2	18	25	24	14	5	...	...	105
Average ...	...	2	4	7	4·5	21	25·5	24·5	11	6	1·2	...	106·7

These figures are probably near the truth.

" The wind is almost always easterly at Julpigoree, with a northerly tendency in the cold weather, and a southerly tendency in the warm weather and rains. No record has been kept of its force. No reliable records exist of clouds, dew, or ozone.

The observations on which the foregoing is founded were taken by the medical officers in charge of the 6th regiment, and by the native doctors occasionally. They were taken in the station of Julpigoree. Some observations were also taken at Mynagoree, by the Sub-Assistant Surgeon in charge of that station, but from what I have seen of them I don't consider them worth much.

The last season was according to all accounts a very normal one.

The cold weather of Julpigoree (November, December, January, and February) is magnificent. The air is bracing, and the nights cold. The range of the thermometer is high, and the fall of dew heavy. The sky is mostly cloudless, and the horizon hazy. The hills thirty-six miles distant, are seldom seen, owing to the vapour always hovering over the Terai, except when a good plump of rain clears the sky: the wind is northerly in the morning and not excessive in force, frequently veering to the south in the afternoon.

The hot weather (March, April, May and June) is very bearable, frequent thunder-showers and storms keep the atmosphere temperate, a strong easterly breeze blows all day. The mornings are cool, the evenings agreeable, and at night the *punkah* is seldom called into requisition. The range of the thermometer is high, and the degree of humidity occasionally very small.

The rains set in fairly in June, and up to the month of September the falls are frequent and heavy.

The atmosphere is cool and clear, and the place is said to be very enjoyable and healthy during these months. September and October are muggy, and then fevers break out with a considerable degree of severity. The type is however mild, as compared with my recollection of the Jessore fevers. Spleen diseases and dysentery are common in the cold weather, and diarrhœa and cholera frequently occur in the southern parts of the district in the hot weather, but the northern part of Julpigoree seems to be exempt from these visitations.

There is no unirrigated land; about nine-tenths is cultivated."

" Tanks are not numerous.

Rice is grown all around and close to the station; food is dear in Julpigoree; the produce of last year was an average one; no blights are apt to occur."

SANITATION, CONSERVANCY, &c.

1. " No systematic sanitary efforts, nor any arrangements for conservancy, have been adopted anywhere in Julpigoree. Sanitation and conservancy depend entirely on the habits and will of the inhabitants. As regards the regiment, sentries are posted to provide that no nuisance is committed near the limits of cantonments, and the Police are instructed to prevent defœcation close to the bazaar. Sepoys and others resort to an open plain to the west of the station. In the lock-up and regimental hospital a system of dry-earth conservancy is adopted. The state of matters appears to be that while nuisances palpable to the senses are prevented, no sanitary measures beyond this are adopted. There is no municipality.

I think that if drinking and cooking water were systematically boiled before consumption, it would be an immense sanitary improvement."

LOCAL CAUSES OF MALARIA.

" All the causes of malaria enumerated are more or less prevalent throughout the district. In the Terai tracts, high grass and *jungle* of all sorts abound; around the station there is no excess of *jungle* and the circulation and perflation of air is not interfered with; an easterly breeze continually comes across the Teesta, and there is no bar to its access to habitations. *jungle* hollows are not so common as I have seen in other parts of Bengal; but still they do exist.

2. The district is undoubtedly malarious and some portions of it eminently and dangerously so. In 1865, the 11th regiment of native infantry, lost some 250 at Pattakowah in this district, and this regiment suffered greatly in its march through the Terai. I don't consider the station and its immediate neighbourhood by any means malarious, compared with such places as Rungpore, Titalyah, &c.

3. The people of this district invariably leave a belt of bamboos around their villages. They suppose this to be a preservative against disease.

In 1865, I am informed that immense clearances took place. Some 10,000 bamboos were cut at and around Mynagoree, for the purpose of road and bridge making, and erecting barracks for troops. It is alleged, that cholera, fevers and dysentery were very rife after these proceedings, but I am unable to establish, with any degree of accuracy, the connection between the clearing and the disease, or to find out whether the area cleared suffered more than in former years, or than other places."

SUPPLY OF WATER FOR DRINKING AND CULINARY PURPOSES.

1. " From rivers, wells and tanks, in the order of enumeration.

2. Not as a rule, there may be exceptional cases.

3. The water of large rivers, such as the Teesta, is considered good."

The tanks in this district are mostly old ones, and have been good and deep in their day; they have now, however, become filled up and greatly choked by vegetable growth. No effort is made to keep them clean.

Both wells and tanks are subject to both direct and indirect contamination.

2. The villages are generally situated on the highest spots of land obtainable.

5. The streets are about thirty or forty feet wide. In villages the houses are not built in streets, but in a series of squares. *Háts*, or market-villages, have one wide central street or road lined with shops, the dwelling houses are more irregular and scattered. The streets and roads are clean.

1. Cantonments are drained into the Kulloo by a system of drains converging to one point, where a sluice is placed to prevent back water when that stream is very full; no other system of drains exists in the district.

2. The drainage-water flows into the rivers.

3. From one to five feet.

4. They are kept carefully cleared.

5. As often as is necessary. There is a staff of coolies kept for the purpose.

6. When the Kulloo gets very high, as it is liable to do occasionally, the water is apt to flow into the drains instead of out of them. The sluice is then closed until the river falls."

7. "As the rises in the river are temporary, depending on a heavy rainfall, the obstruction is also temporary. The closing of the sluice prevents the station being flooded by the overflow of the drains.

8. The place is drained as well as the circumstances of the case permit.

9. Well-privies are used by natives, but not within cantonments. They are common in the Julpigoree bazaar; they are simply holes dug in the earth, to a depth of some four feet, in which the family *excreta* are deposited; they are in every way noxious and objectionable, and do, no doubt, in some instance, contaminate wells, though I cannot cite any particular case. These cess-pits are used by the better class of natives; the poorer classes invariably resorting to the *jungle*."

ACCUMULATION OF FILTH, MANURE, STABLE-LITTER, AND REFUSE MATTER GENERALLY.

1. "There are accumulations of this description in cantonments.

2 & 3. They are removed every morning in carts provided for the purpose.

4. The refuse is carried to some distance from cantonments, and thrown in an open field.

5. Manure and refuse are carried off together. Cow manure is carefully collected by native women and used for fuel.

6. Only in the way described in answer to the last question."

CREMATION AND INTERMENT OF THE DEAD.

1. "On the banks of the rivers.

2. Yes. In some cases the burning is probably imperfect.

3. Bodies are buried about four or five feet beneath the surface, at some distance from villages and human habitations.

4. Not that I am aware of.

5. I have not heard of any neglect in the disposal of the dead."

SLAUGHTER OF ANIMALS AND DISPOSAL OF THEIR CARCASES.

1. "There is a slaughter-house beyond cantonment limits, for cows. Goats and sheep are slaughtered in the bazaar."

When animals die, their carcases are either thrown on a field or into a river."

OBNOXIOUS TRADES, NUISANCES, &C.

1. "There are no public nuisances around Julpigoree, except those already adverted to pertaining to excreta, and carcasses.

2. Not on a large scale."

4. Jute is steeped in small tanks, specially dug for the purpose, and the people consider the water of these bad."

(2.)—GENERAL CLEANLINESS AND SALUBRITY, OR THE REVERSE.

1 & 2. "The atmosphere is not generally tainted.

3. Occasionally, odours are perceptible about natives' houses and bazaars.

4. They are due to human excrement and carcases. The process of ablution is conducted on the margin of the well, and the water partly finds its way back into the well."

GENERAL MODE OF LIFE.

1. Girl-marriage is very common, almost universal, and must tend to impair the vital stamina of the race.

2. Prostitution is very rife, and enthetic diseases, affecting both sexes, and all ages, are exceedingly frequent.

3. Food is eaten in too large a quantity at a time, and at too long intervals; hence the frequency with which dyspepsia, obstipatio, and colica figure in returns.

4. Fatigue and frequent wetting during the cultivating seasons, produce many cases of rheumatism, which is a common disease; sleeping on damp floors has also much to do with its production."

UNWHOLESOME LIQUORS.

"Intemperance cannot be said to be common."

SPECIFIC DISEASES.

"The fevers of this district vary considerably in kind; from the mild intermittent of the hot months in the healthiest localities, to the severe remittent of the Terai in the months of September and October."

"The *fevers* of Julpigoree itself, as far as I have seen, are, in the great majority of cases, intermittent, and depend greatly on meteorological changes.

In some other parts of the district severe forms of remittent are common, but I have not seen any cases of it as yet.

Splenic enlargements are common.

Bronchitis and *diarrhœa* are also frequent concomitants. *Pneumonia*, which I found to be such a frequent and fatal complication in the Jessore Jail, is here rare. I have not seen a case of *cancrum oris* since I came; in Jessore such cases were very common, as also the resulting *atresia oris*; these conditions usually affected children.

On the whole, on comparing my recollection of the fevers of Jessore, with my experience of the fevers here, I have no hesitation in saying, that the latter are much milder; continued fevers are rare. I have seen no cases of true continued fever.

2. *Cholera* is raging to the east and west and south, at this moment (14th May), in a very severe form, but it is not a frequent visitor of this district. It seems to have marched north from Rungpore, Cooch-Behar and Purneah. I shall report specially upon it when I have obtained information.

3-4. *Diarrhœa* and *dysentery* are common, but not exceptionally so.

Dysentery seems to prevail very generally when the nights begin to get cold in October.

5. *Small-pox* has prevailed to the east around Doobree. Vaccination is actively pushed in these parts by a special agency, whose head quarters is at Darjeeling. Small-pox is not a frequent epidemic of Julpigoree as far as I know.

Hepatitis does not appear to be common, and I have not seen a case of hepatic abscess since I came to the district.

Bronchocele seems to be endemic.

Skin diseases are exceedingly common."

EPIZOOTICS.

"I believe that oxen and buffaloes are liable to *Gootee* in this district, but I have no personal knowledge on the subject."

19.—DARJEELING.

THE REPORT IS FURNISHED BY DR. B. SIMPSON, THE CIVIL SURGEON.

"Darjeeling.—*Latitude* 27° *North.*—*Longitude* 88° 22′ *East.*"

Portions of some of the villages and the Terai are exceedingly unhealthy at certain seasons only; the more elevated portions are healthy.

I am unable to furnish any reliable information, but all accounts concur in making the climate less damp than formerly. When Dr. Campbell originally came up to Darjeeling, there were only about fifty families in the whole tract. The population is now I fancy about 60,000. All the surrounding hills below a certain elevation which were formely in dense jungle have been cleared and cultivated. These remarks also apply in a great measure to the Terai in our district. I have no doubt from a comparison of present experience with accounts received from old residents, that the district is more healthy on the whole than formerly.

Hooping-cough has been prevalent both among the native and European population during the early part of the year, a peculiar type of typhoid fever broke out suddenly in one particular locality in the station itself; one patient died out of seven attacked. The cause is not very clear, but the disease soon disappeared without spreading any further, and has not since returned.

Fevers are more prevalent as a rule in the cold weather and at the close of the rains. These remarks apply more especially to the lower elevations. The Police as a body are unhealthy; this is chiefly owing to the number of unhealthy posts they have to occupy, superadded to the extreme vicissitudes of climate to which they are subject.

The jail is remarkably healthy. The small mortality which does occur would be reduced to a minimum if the prisoners were only natives of the Hills; last year the three deaths occurred in men sent up from the Terai to undergo their sentence in this jail, which is the sudder jail of the district. They almost invariably suffer from the change.

The population is estimated at about 60,000 souls. This information is derived from a pamphlet read lately before the Ethnological Society by Dr. Campbell. I am unaware of the source of his information. There is no registration of births or deaths. The population is chiefly agricultural. The Nepalese element in the population is the most fluctuating, great numbers of families coming for mployment on Tea Gardens and Public Works during the cold season, and returning in the summer to their homes, to cultivate their crops."

METEOROLOGY, CLIMATE, &c.

Temperature and rain-fall for the last two years.

YEARS.	TEMPERATURE.					RAIN-FALL IN INCHES.	REMARKS.
	Highest.	Lowest.	Mean of all the highest.	Mean of all the lowest.	Proximate mean.		
1st July to 31st December 1867 ...	75	34	72	45	53	83·29	Observations commenced from 1st July 1867.
1st January to 31st December 1868 ...	78	32	69	43	56	129·36	

The obscovations were taken by the Sub-Assistant Surgeon.

" The climate is decidedly more humid than that of any of the hill-stations of the North-West, but at the same time I consider it much more healthy than any of them. Bowel complaints, so common at Simla and Mussoorie, are almost unknown here. The influence of the climate upon children especially, who come up sick from the plains, is surprising. Darjeeling appears to partake of the character of Bengal in the same proportion as the hill-stations of the Punjab and North-West partake of that of the adjacent plains, *i. e.*, you find in these latter a much higher temperature during summer than at Darjeeling; whereas in winter the cold is much more excessive. In fact the temperature here appears to be much more equable, and the diurnal changes of temperature much less. The greater moistness of the climate does not appear to have any pernicious influence on disease.

There is generally one fall of snow during the year in February, which only remains a few hours on the ground, but at Sinchal, the abandoned cantonments, it lies for weeks; the difference in height is about 1,300 feet."

SANITATION, CONSERVANCY, &c.

" The sanitary condition of the station of Darjeeling is, on the whole, good, but the conservancy arrangements have been up to date most defective, and this is beginning to be felt more as the population increases. The Municipality are responsible. An active interest is taken by them in the matter. Arrangements are at present being made to carry out a plan of conservancy proposed by Mr. W. G. Hickey, Civil Engineer. It consists in carbonization of the night soil and refuse, in retorts made for the purpose, the offensive gases being passed through water. I believe this plan has been tried in the Alipore Central Jail, with considerable success. I myself approve highly of the principle involved. There are no local circumstances especially inimical to health in Darjeeling.

The water-supply in the Hills is entirely from springs. The water is exceedingly pure, almost destitute of salt; I consider it very wholesome. I am not aware that any proper analysis have been made of it.

In some compounds cess-pits are used, from four to six feet in depth, but none are situated in the vicinity of springs. Public latrines exist on a limited scale only; they are kept tolerably clean by men appointed by the Municipality. The dry-earth system is not in use, except in the jail and civil hospital and one public school. The night soil is generally carried away from the houses and deposited in the jungle by the *mehters*. The excreta of sick people are not disposed of with any special care."

SPECIFIC DISEASES.

" *Fevers*—Intermittent, and remittent, are common at low elevations.

Small-pox—Is not nearly so common as formerly, owing to Government having interfered to put an end to inoculation, which was formerly carried on extensively by men from Nepal.

Bowel complaints are rare, as compared with the hills in the North-West.

Goître is very common; much more so among the Bhootiahs and Lepchas than the Nepalese.

It is also common among the *Meckees*, a wandering tribe inhabiting the *Morung*."

EPIDEMICS.

" There have been no epidemics in the district since I took charge of the civil station, with the exception of one epidemic of cholera which occurred to a limited extent in 1864. It appeared simultaneously all over the district. The deaths, as far as I can ascertain, were few, and the duration of the epidemic was short. I am not aware that any Europeans were attacked. It appeared to be confined entirely to natives."

20.—PURNEAH.

Dr. Picachy, Civil Medical Officer, instead of submitting answers to the sanitary questions, has merely sent in a copy of his Annual Jail Report. This is not what was wanted. The only part of the report received, which it seems necessary to extract is the following, regarding the meteorology of the past seasons at Purneah:—

"*Rain*—74·8 inches of rain have fallen during the year in forty-eight days. The largest fall in twenty-four hours having been 17·7 inches on the 18th of August, the day of the eclipse.

The total rain-fall has been less than last year by forty-one inches. The periodical inundations have not been severe.

The last fall of rain was on the 30th of September, since which time, there has been a drought, which is telling upon the cold weather crops."

Dr. Picachy reports that no epidemics prevailed. He makes the following remarks regarding *Parotitis* :—" This is a form of disease frequently met with in this district, where, owing to malarious saturation of the system the parotid gland takes on indolent inflammation, seldom running on to suppuration. Symptomatic fever keeps pace with the inflammation, muttering delirum sets in, and coma precedes death."

21.—BURDWAN.

THE REPORT IS BY DOCTOR MANTELL, THE CIVIL SURGEON.—

" Town of Burdwan— *Longitude* 87° 56'. *East—Latitude* 23° 12'. *North*

The town of Burdwan is generally healthy.

As far as I can ascertain, the condition of Burdwan has not altered much for several years; it still bears a good character for salubrity, although fever has, at certain seasons, been more prevalent than formerly.

I cannot furnish any statistics of sickness or mortality amongst the population of Burdwan that will be in the least reliable, as no records are kept.

Remittent and intermittent fevers are more general during the months of September and October, the conditions being extreme heat, combined with atmospheric moisture, also the drying up of the rice-fields which encroach on many parts of the town.

The people of Burdwan Town generally look healthy; they are able-bodied and fit for work; they are, as a rule, industrious. As regards the health of the inhabitants, Burdwan Town has not varied for some years."

"The population of the place is said to be 30,000. This information is not reliable, although it was obtained from the Collector's office.

The Collector remarks, that there are "no means of distinguishing males and females," and that the population is only "supposed" to be as above. No regular registration of births and deaths has been attempted.

The population is partly agricultural, but chiefly consists of artisans and shop-keepers.

Burdwan Jail.

	1864.	1865.	1866.	1867.	Total.
Average daily strength of Prisoners ...	412	486	578	395	467·7
„ Sick to strength	23·8	15·3	50·	20·1	27·3
„ Deaths to strength	5·3	3·2	9·	4·4	5·4

Burdwan Police.

	1864.	1865.	1866.	1867.	Total.
Average daily strength of police ...	627	531	639	520	579·2
„ Sick to strength	4·7	3·6	13·2	10·4	7·9
„ Deaths to strength	·63	·18	·46	1·53	·70

Burdwan Government Dispensary.

	1864.	1865.	1866.	1867.	Total.
Out-patients	33·9	34·3	34·4	35·2	34·4
In-patients	11·2	16·1	17·9	14·4	14·9

"In these tables I have given the comparative health of the prisoners and police, as also the average daily attendance at the government dispensary. The comparative health of the civil population generally it is impossible to give with any accuracy, as no census has been taken for several years.

The town abounds in tanks and ponds, and is surrounded by paddy-fields. It is densely populated, and the native houses are as usual closely packed together.

As regards the extent of slope or "fall" the Executive Engineer informs me that the question cannot be answered, as no survey or comparative levels of the surrounding country of Burdwan exist in his office. On an average the subsoil water is found twelve feet below the surface.

The banks of the Damoodah, contrary to those of the Banka, are lower than the level of the surrounding country. The town of Burdwan is higher than the flood-level of the Banka, but lower than that of the Damoodah.

'No silting takes place in the Banka River, and the silting in the Damoodah is not accumulative.' (Executive Engineer, Damoodah Division). 'The Damoodah alters within its own banks; the flood-water scouring in some places, and depositing silt in others, so that the cold weather channel varies after every rainy season.' (Executive Engineer). "Disease does not appear to result from any of these changes. The natural drainage of the town is carried off by the river Banka; the surrounding country is only partly under water in very heavy floods of the Banka River; in consequence of the bund of the Damoodah being situated on the Burdwan bank, flooding from this river does not occur. The flooding from the Banka usually occurs in July or August.

The natural drainage of the country round the town of Burdwan is not interfered with by roads, embankments or railways.

Burdwan has no swamps, marshes, jungle-tracts, lakes, villages, or forests near it, but rank vegetation is prevalent in its suburbs. Tanks, ponds and ditches are plentiful. It is surrounded by paddy-fields and other low-lying ground, and it is surprising that it should always have had a high reputation amongst the natives for healthiness. The Banka River during the hot season becomes a very shallow stream, it is used as the common drain to the town, and is generally about twenty to sixty feet cross during the rainy season, *i. e.*, when not flooded, it rises some miles from Burdwan and empties itself into the Damoodah. The Banka is not a source of disease, on the contrary it is useful in clearing the town of impurities. It has been proposed to build an

Anicut across this stream to keep back the water, but I should oppose such a scheme as one dangerous to the town, unless the water could be frequently changed."

METEOROLOGY, CLIMATE, &c.

"Appended are meteorological statistics for past years and up to date. There are no thermometers or barometers at present in store. Indents have been sanctioned for the instruments required. The observations of the rain-guage are taken by myself, and the native doctors who may be in charge of the jail. The instruments have always been kept at the Jail Hospital. The past season has been remarkable for the great rain-fall as compared with former years. The climate of Burdwan is very similar to that of Calcutta, excepting that here the sea breezes during the hot season are not felt so regularly or so early in the evenings. The heat during the hot months is greater in Burdwan than in Calcutta, but at that season drier. The cold season also is of longer duration, and more intense.

The rain-guage observations for the past years are given below, and are trust-worthy. The thermometrical records for four years are given; at present no instruments of this class are in store.

RAIN-FALL.

MONTHS.	1863.	1864.	1865.	1866.	1867.	1868.	REMARKS.
January	...	...	...	2·3	·3	...	
February	·5	1·2	2·6	·3	·3	·7	
March	...	·9	1·9	·4	1·1	·9	
April	·6		1·9	2·3	1·8	1·9	
May	4·4	5·9	16·3	1·5	2·5	6·5	
June	17·5	7·3	5·2	16·5	8·8	12·9	
July	13·9	14·	14·	10·7	13·9	8·6	
August	21·4	9·7	4·	13·3	12·5	29·6	
September	4·9	4·2	6·6	5·6	6·4	14·5	
October	2·	8·3	...	3·4	4·8	·1	
November	·3	·3	...	...	2·5	...	
December	...	...	·1	...	...	...	
TOTAL ...	66·5	53·3	52·6	56·3	54·9	75·7	

Thermometer.

MONTHS.	MEAN TEMPERATURE.						REMARKS.
	1863.	1864.	1865.	1866.	1867.	1868.	
January	69°9	68°3	73°6	83°6	66°	...	I much doubt the accuracy of these returns on account of the imperfection of the Thermometers.
February	73°1	73°4	74°1	76°	79°	...	
March	84°	80°7	80°4	88°	...	...	
April	85°5	87°3	87°3	81°	...	...	
May	86°1	87°8	84°3	84°	...	...	
June	85°	88°2	87°4	86°	...	...	
July	85°4	84°3	87°9	82°	...	...	
August	83°8	83°9	89°3	82°	...	...	
September	85°1	85°3	89°	84°	...	...	
October	85°2	81°5	92°8	80°	...	...	
November	77°6	76°3	91°8	71°5	...	...	
December	69°1	71°3	92°6	67°	...	...	

Wells are not used in the town of Burdwan. The prisoners in the civil jail use the water of a well for drinking and cooking purposes. The average depth of water in it from the surface is about eight feet. The well is of *pucca* construction.

Tanks are very numerous. The local supplies of grain are sufficient for the wants of the people.

Food on the whole is dear in Burdwan.

4. The produce of the past year is up to the full average."

SANITATION, CONSERVANCY, &c.

" In the Town of Burdwan, conservancy is attended to under the orders of the Municipality, but the difficulties in carrying out any arrangements of the kind are very great, in consequence of the extreme apathy of all classes of the inhabitants.

That the town is cleaner than formerly there is no doubt, but the cleanliness and drainage within private houses and court-yards attached to them are as defective as ever."

"The Municipal Commissioners are responsible for the sanitation and conservancy of the town, but little real active interest is taken in the matter by those whose assistance and co-operation would be most valuable, *viz.*, the native Commissioners, who live in various parts of the town itself.

The following sanitary improvements have been carried out.

1. A *pucka serai* has been built near the Railway station, but not being approved of by the natives it has failed in the object for which it was intended. A sub-committee has been formed from amongst the Municipal Commissioners, to report on the subject.

2. Drains have been opened through different parts of the town, and made to empty themselves into the river Banka.

It is proposed to build an extensive latrine in the centre of the town as an experiment; the Commissioners are waiting for funds for the purpose.

The improvement which I would wish to suggest is the appointment of an Inspector of Nuisances, whose duty it should chiefly be to visit the ground floors of all native *pucca* houses, and the court-yards of both *pucca* and *cutcha* houses, throughout the town; it is in these places that filth is allowed to accumulate, and thus poison the atmosphere. Until a system of this kind is adopted it will be perfectly impossible to keep the town clean, or to decrease the sickness and mortality."

LOCAL CAUSES OF MALARIA.

"The town is full of stagnant pools and hollows not filled up, but unfortunately the Municipality, for want of funds, is unable to cope with this great evil."

SUPPLY OF WATER FOR DRINKING AND CULINARY PURPOSES.

"The drinking water is obtained from the Banka River, and from tanks. The people do occasionally drink the water of small ponds; this, however, is exceptional.

The water of the tanks from which the inhabitants are supplied for drinking is generally good, and if carefully selected, and filtered, I consider it fairly wholesome; it has not been analysed. The natives think it very good, and with them it is proverbial that the "air and water" of Burdwan are both good. The supply of water is abundant, it is chiefly procured from large and deep tanks belonging to the Moharajah of Burdwan, who keeps them clean as far as possible. The ground in the immediate vicinity of these tanks is generally somewhat raised or enclosed by *bunds*; they are not subject to contamination direct or by percolation

The river Banka is contaminated, as the drainage of the town runs into it. Surface-drainage of rain water runs into all the tanks; they are mostly enclosed by a garden or a *bund,* and short *pucka* drains lead down the banks to convey the rain water into them, but this surface-drainage is not objectionable. The tanks are cleared of weeds annually. A few trees grow near these tanks, so that decayed leaves are in places found on the surface of the water; at the bottom of all these tanks rotting vegetation is plentiful. Persons are allowed to bathe in all the Moharajah's tanks, excepting in one, which he keeps for drinking water for himself, his house-hold, and the public. The Municipality have set aside certain tanks for drinking purposes, and in these bathing is prohibited.

On the whole I do not consider the water unclean.

The average width of the roads is fourteen feet, they are generally kept clean by the servants of the Municipality.

There is no particular plan of drainage for the town of Burdwan; the river Banka is the common sewer, and it is proposed to drain the whole town into it; at present it receives all the drainage water, after the tanks, ponds, &c., have been filled. I do not consider the town properly drained, and much expense must be incurred before it can be so. "Well-privies" are extensively made use of by those occupying *pucca* houses; they are generally built out at one corner of the habitation; sometimes they are distinct buildings."

DWELLINGS &c.

"I have caused several native houses to be measured, and have also ascertained the number of persons who are in the habit of sleeping in the rooms during the cold season. The following averages are as near as I am able to obtain with any certainty.

Average number of inmates in each dwelling	5
,, superficial space of air enjoyed by each.. ..	28
,, cubic space of air enjoyed by each	192

The cubic space is small in consequence of the lowness of the buildings.

The well-privies are not situated near the sources of water-supply."

“They are built of brick-work and are generally four or five feet deep; over these is a *pucca* floor with a circular or square hole near the centre, the privy room is six or eight feet square and covered by a *pucca* roof.

No public latrines exist in Burdwan, but the Municipality intend shortly to construct one in the centre of the town, as an experiment.

The dry-earth system is not adopted, trenches are dug for the reception of the ordure of the *serai* which was built by the Municipality. The night soil of the town is chiefly thrown into the river Banka. The *excreta* of sick persons are not disposed of with any special care.

There are no accumulations of this nature in those parts of the town where the Municipal sweepers have access. The sweepings of the town were formerly all thrown into the Banka; now, however, they are carted and thrown into excavations which it is desired to fill up. As soon as these excavations are full, or nearly so, the owner of the land is required to put a layer of earth on the top. Accumulations of stable-litter and refuse matter generally are carted away every morning, as early as practicable, after the inhabitants have placed them in certain localities fixed upon by the Conservancy Department. The manure of sheep, cattle and horses is quickly seized by the inhabitants who dry it and use it for fuel. The dung of other animals, such as dogs, &c., is taken up with the other sweepings and carted into the excavations alluded to above. The *Methers* employed by private people deposit the filth of privies on the banks of the Banka River. The Conservancy Department consists of four sub-overseers, fifteen *sirdar methers* or chuprassees, and fifty five *methers*

Dead bodies are burnt at two *ghats* on the Damoodah River at some distance from the town, *viz*, at the Sudder and Koshtagolah ghât. The burning is not done carefully in the case of those who are too poor to enable them to purchase a sufficient quantity of fuel. Bodies are interred quite close to human habitations; they are ordered to be buried six feet below the surface, but it is doubtful if they are ever buried much below two or three feet, no corpses are thrown into any streams or pools near the town.

There are special places for slaughtering animals within the limits of the town, four for bullocks, and three for sheep and goats, they are licensed for the purpose. The slaughtering places are close to the habitations of the people, in fact they are surrounded by them.

No offal remains in the slaughter yards. The blood runs into the ground, and every other part of the animal is sold, and thus disposed of.”

" The general atmosphere is tainted only in those parts of the town inhabited by persons of the better class, who allow their privies and drains to remain in a dirty condition, and into whose houses and court-yards, the conservancy overseers are not permitted to enter. Unpleasant odours are constantly perceptible in many such places, and nothing can be done in the way of prevention until the legislature interferes.

I consider that many circumstances predispose the lower class of natives to disease; for instance, their habit of fasting from the early morning till midday, and then eating a large meal in an exhausted state. The *Chumar* and *Chassa* classes, and some others eat raw rice and gram for their morning's meal. All classes eat *mooree, choora, ookera* (different preparations of rice) when circumstances prevent them from obtaining their regular meals.

I am unable to furnish any statistical records of sickness, or mortality of epidemics which have occurred in the town of Burdwan, as none are kept.

The number of *boids* in Burdwan town is from 10 to 15, of *kobirajes* 20 to 25, of *hakeems* 10 to 12. I have no information as to the number practising in the district.

Their influence among the people is not increasing, although, the number practising has increased, in consequence of the expensiveness of European medicines and European medical aid.

In cholera they interdict the use of water, and administer white arsenic in ten grain doses. No water or nourishment of any kind is permitted to enter the lips.

Mustard oil is rubbed over the body and limbs.

In small-pox, the treatment consists of cooling drinks, food, &c., and on the eighth day *huldee* is rubbed over the body. In fevers, the favorite remedy is called *paunchun,* which is a decoction made of five different kinds of roots. No purgative is ever given, and for eight days, no water or food is allowed.

Hot sand in cloth is applied to the head and different parts of the body. The yellow, white and red arsenic are administered; also the poison of the black cobra."

SPECIFIC DISEASES.

"The chief endemics, are intermittent fever, remittent fever, cholera and small-pox."

"The two first named diseases occur annually at the close of the rains. The lower classes of the people are those that suffer. At this season the number of jail sick and police sick is very greatly augmented.

The attendance at the charitable dispensaries is much increased; our servants fall sick repeatedly, and all from the same cause, endemic fever, depending upon the drying up of the paddy-fields and shallow tanks which abound in and around the town and suburbs of Burdwan. Two years ago there was an outbreak of small-pox in the town. This disease was supposed to have been imported by the sufferers at the time of the famine. A hospital was established by the Municipality for the reception of small-pox cases, but none could be induced to go there. There was not any law to compel them, and consequently the cases admitted were few. I have no statistics as to the extent of the disease.

Outbreaks of cholera are of occasional occurrence in Burdwan, but the character of the disease is generally mild. Every year, during the hot season, sporadic cases are reported. Last April a man from Calcutta died on the day of his arrival close to the civil jail; four other cases occurred close to his house, of whom two died. Synchronously, a few cases occurred in the civil jail, and the prisoners were moved out into camp, which at once had the effect of stopping the disease. Nine prisoners were admitted for cholera into hospital, between the 14th and 17th of the month, but no deaths took place. The prisoners were in the habit of passing through the small road leading by the houses of those who died outside the jail, and in this way communication of the disease appears to have had its origin."

EPIDEMICS.

"The epidemic fever, which has occupied so much attention during the past two years, first appeared in the town part of the Burdwan district, at the close of the rains in 1866, and in December of that year. The attention of the government having been called to the matter by the native newspapers, native doctors were appointed to attend the sick. The disease, which appears to have gradually spread from the Hooghly and Nuddea districts, made its appearance in a large number of villages, near Mymarree and Culna. The predisposing cause was apparently the famine of 1866, during which the poorer classes suffered very severely, and of these classes the villages affected are almost entirely composed. The exciting cause was apparently a malarious atmospheric wave gradually spreading in a north-west direction, and poisoning every village through which it passed. It is very difficult to assign any other causes for this highly malarious fever; no doubt the drying up of foul tanks, and the drinking of impure water increases its virulence, but these matters are not new; impure water has been drunk by the same people for years past, and foul tanks have existed in all Bengali villages from time immemorial. The epidemic does not appear to be influenced by caste, age, sex or habits. All are equally liable to it, the better and the poorer classes suffer alike.

The symptoms are those of malarious fevers generally, but far more violent. Both the remittent and intermittent types are prevalent. The former may continue for several days, with scarcely any remission; during that period death has occurred in three or four days after seizure. The most serious circumstances connected with these fevers are the complications, which invariably accompany them, *viz.*, congestion and permanent enlargement of the spleen or liver, both followed in a few months by dropsy, dysentery or chronic diarrhœa, all of which are past treatment. The brain suffers to a great degree in the early stages, delirium and partial insensibility being common concomitants.

In both the intermittent and remittent types the spleen is apt to become greatly enlarged in a very few hours. The remittent type is generally succeeded by the intermittent, and recurrence is very general during the breaking up of the monsoon and greater part of the cold season. The sequelæ of this epidemic are hypertrophoid spleen or liver, or both, extreme anæmia, anasarca, ascites, œdema of the lower extremities, glandular enlargements, *cancrum oris*, and sloughing buboes, dysentery and chronic diarrhœa. The mortality results more from the sequelæ, months after the primary attack, than from the early attacks of fevers as far as I have been able to ascertain; about three-fourths of a village suffer from the epidemic during an outbreak, and the mortality amounts to 6 per cent.

As regards the treatment, it has been conducted on general principles; much larger doses of quinine are required to check the intermittent type; and in the remittent form, quinine does not appear to be of much benefit; the disease, in spite of all that is done, will run a certain course, and the results to the constitution are most serious. I cannot say that any remedies have been specially serviceable in this fever.

From what I have myself seen of the disease, from what I have gathered by repeated enquiries amongst the inhabitants of the affected villages, and from what has been observed by Sub-Assistant Surgeons and native doctors, who have attended cases, it does not appear to be either contagious or infectious. On the other hand there is abundant proof of the localities themselves being infectious. Several respectable Natives, whose homes are in the affected villages, have left them when first attacked by the epidemic, and, at the end of a few weeks, have returned in good health, only to fall sick of the same fever immediately. The measures used for mitigating this fever are entirely those relating to conservancy. The low jungle has been frequently cut, so as to admit of the perflation of air, and certain tanks have been set aside for drinking water. The inhabitants, however, are extremely apathetic, and render scarcely any assistance in the endeavour to eradicate the disease."

"In consequence of this apathy no particular rules could be laid down for observance. The epidemic has generally, as regards new cases, lasted from September to 3rd of December. It appears as if the outbreak subsides shortly after the paddy-fields have dried up. Chronic cases, however, remain the same, and fever amongst them continues more or less throughout the year. Subsidence of the disease continues during the hot season and early part of the rains. Since it commenced, in 1866, the epidemic has never disappeared, but on the contrary increases in a north-westerly direction, and has affected the village of Gangpore, about six miles to the south-east of Burdwan Town. There are no records to show that it is connected with any particular meteorological condition.

From the Police reports forwarded for my information at the close of last year, it appears that in the Selimabad Division of Burdwan, consisting of about 123 villages, containing 51,925 persons—884 deaths occurred from epidemic fever, the ratio *per mille* being 17. In the Gangoria Division, containing about 38 villages, with a population of 27,221,—1,259 deaths occurred from the same fever, the ratio being 46·1 *per mille*.

These deaths are said to have occurred in three or four months. There are no means of ascertaining the proportion of old cases to new ones; and until the system of registration of births and deaths is introduced, very few mofussil statistics can be relied on.

I may here give an account of an endemic of this malarious fever, which has prostrated the inhabitants of Selimabad, a village about nine and a half miles from the Mymarree Railway Station, on the East Indidia Railway. Last cold season this village, which consists of about 1,300 persons was comparatively healthy, when I paid it a visit. Malarious fever commenced then during the late rains, and now there is not one person who has escaped an attack; it has not been particularly fatal, but it has seriously damaged the health and strength of all its victims."

"A Sub-Assistant Surgeon was sent there in October last to open a dispensary, and he has caught the fever; his spleen became greatly enlarged in a few hours, and he is still constantly suffering from fever.

The compounder of the dispensary, a Calcutta man, was attacked shortly after his arrival at the village, and he also cannot shake off the fever. I have lately visited the village and found the Sub-Assistant Surgeon recovering from a relapse, and the compounder lying on his bed in high fever with great enlargement of the spleen. His symptoms were those of malarious fever. It is now about two months since the Sub-Assistant Surgeon established the dispensary at Selimabad, and he is not able to say with confidence that he has cured one fever patient; he relieves most that attend the dispensary, but as soon as they cease taking medicine the fever returns. As for cases of enlarged spleen, it is quite impossible to cure them so long as they remain in the fever districts. The constables suffered so much at Selimabad that I recommended the removal of the *thannah* to Jamalpore, a village a mile and a half distant.

This has had a good effect, as regards those resident at the *thannah*, but directly a constable is sent into the interior to make investigations, he is almost certain to fall sick of fever."

VACCINATION—INOCULATION.

"Vaccination is carried on in Burdwan town, by one governnent, and two municipal vaccinators; these men also vaccinate in the villages within a few miles of the town, under my own supervision. Attached to the Maharajah's dispensary, there is one vaccinator who vaccinates in the town, and adjacent villages.

At the sub-divisions, excepting Cutwa, very little is done in the way of vaccination.

At Cutwa, last season, the Sub-Assistant Surgeon took great interest in the matter, and with a vaccinator visited many villages in the sub-divison. He was very successful in overcoming the prejudices of the people, chiefly by carrying on a system of mock *poojahs*. In the Mymarree Division Dr. Charles' establishments of vaccinators, vaccinated extensively in 1865-66.

Attached is the number vaccinated in Burdwan town and district during the year 1867-68. The prejudices of the people have been overcome to a very small extent. Vaccination being compulsory, rather inoculation having been interdicted, the people are forced to submit to the former. Inoculation is universally practised in the district, but I have no statistics respecting it."

"*General vaccine return of the Burdwan civil station for the year* 1864 *to* 1868.

Years.					Total number vaccinated.	Successful.	Unsuccessful.	Doubtful.
For the year 1864	...	...	...		599	547	52	...
Ditto 1865	...	...	...		575	505	65	5
Ditto 1866	...	...	...		1,059	968	63	28
Ditto 1867	...	...	...		1,624	1,569	40	15
Ditto 1868	...	...	...		1,277	1,161	41	75
		Total	...		5,134	4,750	261	123

The return for 1868 does not include any vaccinated at the end of the year, as all operations have ceased, pending the establishment of the Metropolitan Circle, in which Burdwan is included."

22.—CUTWA.

Doctor Mantell, Civil Surgeon of Burdwan, forwards a Sanitary Report from Sub-Assistant Surgeon Chunder Nauth Biswas of Sub-division Cutwa.

"Cutwa.— *Latitude* 23° 38′ *North.—Longitude* 88° 6′ *East.*

Healthy.

The drainage system has been much improved.

Leprosy and elephantiasis are rare.

Population of Cutwa.

Men.	Women.	Children.		Total.
		Male.	Female.	
2,273	3,331	1,259	888	7,751

"The bed of the Hooghly is gradually becoming higher and higher, consequently the natural drainage of the town has been interfered with to a certain extent; this is more or less the case with all towns and villages situated on and near the banks of the river."

METEOROLOGY, CLIMATE, &c.

"Thermometrical readings have been regularly recorded from June 1867. The maximum temperature was 97° Faht. during 1867, and also during 1868; and the minimum temperature during the last cold weather, 58° Faht. The mean temperature during the year commencing from the 1st June 1867 was 79°18."

Statement shewing the Maximum and Minimum Thermometrical Readings from June 1867 *to May* 1868.

Months.	Maximum.	Minimum.	Average maximum for the month.	Average minimum for the month.	Average mean temperature for the month.	Average mean temperature for the year.
June 1867	97°	81°	89°00	84°50	86°75	79°18
July	90°	80°	86°50	82°84	84°67	
August	88°	79°	85°64	80°13	82°88	
September	90°	79°	86°06	83°23	84°64	
October	87°	73°	83°77	80°00	81°88	
November	80°	66°	76°83	71°33	74°08	
December	74°	60°	70°06	63°00	66°53	
January 1868	76°	58°	70°61	62°42	66°51	
February	81°	60°	75°31	66°00	70°65	
March	92°	63°	84°71	75°00	79°85	
April	96°	75°	90°00	80°93	85°45	
May	97°	77°	90°06	82°52	86°29	

A rain-gauge was received in June last. The rain-fall for each of the last five months is given below :—

June	9·38	Inches.
July	9·4	„
August	15·9	„
September	7·6	„
October	2·3	„

" The produce of the past year was a little below the average of former years.

The local officers are going to recommend the introduction of the new District Municipal Act into the town, in the place of the present Chowkeedaree Tax Act; when this is done, the municipal income will increase, and thus there will be ample means for improving the condition of the town."

FAIRS.

Three fairs are held in the Sub-division : at Oodhanpore, at Doidha and at Keshara. The average number of people present may be estimated at about 10,000."

The Sub-Assistant Surgeon reports that many prostitutes spread infectious diseases at these fairs.

VACCINATION—INOCULATION, &c.

Regarding vaccination, Baboo Chunder Nath Biswas reports as follows :—

" I am glad to say that I succeeded in vaccinating 1,852 persons in the course of three months; with the exception of 123, all the cases were successful. In the villages I had to visit, I experienced very great difficulty in the beginning, but gradually I succeeded in removing the prejudices of the people to a great extent, and made them understand the advantages of vaccination; towards the end of the season I carried on vaccination even at *Gourangaparah* (Cutwa) which is the stronghold of superstition in this Sub-division."

The Sub-Assistant Surgeon is sanguine that if energetic means are continued that " vaccination will be as common as inoculation in the course of a few years."

NATIVE PRACTITIONERS.

"The number of *boids* and *kobirajes* who regularly practise in the town, is eight. There is no *hakeem* in the town, I often come in contact with these native practitioners, they are not educated persons, and they know very little of the *Needan* or the *Ayurebadhya*; their knowledge is generally derived from tradition. They are sometimes successful in simple fever cases; if there be any complications they make the cases worse. They make the patient fast for weeks, and when the system is very much debilitated, they generally give some poisonous drugs. Several such cases, ultimately given up by them, have come under my treatment; I have found patients to recover simply from the use of tonics, stimulants and nutritious food.

Their influence is undoubtedly decreasing in the town."

23.—BANCOORAH.

THE REPORT IS BY DR. VINCENT RICHARDS, CIVIL MEDICAL OFFICER.

Bancoorah.— *Latitude* 23° 14′ 8″ *North.—Longitude* 87° 6′ 3″ *East.*

" This district has always been more or less healthy, with the exception of the towns of Sonamookhy and Bishenpore.

The mortuary returns are rendered by the police, and I think they are tolerably correct.

Leprosy is common, and elephantiasis is occasionally met with.

I believe the health of the district is improving, with the exception of perhaps Sonamookhy, Patrashuhur and Bishenpore.

The population is nearly 600,000.—The return I gave formerly, viz., 438,495, I find was the supposed population some years since. Registration of deaths was begun in August last. The Police have the management of it. I believe it is tolerably correct. No registration of births is kept. I think there would be little difficulty in keeping this also.

Under the present arrangements no copy of the register is sent to the medical officer. I am of opinion that this is a mistake as the medical officer is most certainly the person to whom information would be most valuable, and of whom information on the subject is required. I would suggest that a copy be sent to the medical officer every month, he would then be in a position to judge of the health of the district, and of the precautions to be taken in case of extraordinary sickness.

About one-third of the population are agricultural laborers, and the other two-thirds merchants, zemindars, shop-keepers, braziers, weavers, &c., &c.

The population on the whole is thriving ; Bishenpore, however, is an exception to the other parts of the district. A large proportion of its population are weavers (silk), the demand for the silk is now very small, and the Rajah who formerly helped to support the dignity and prosperity of the place, is now but a dependant of the government. Here also the ravages of the famine of 1866 were most felt."

Bancoorah District.

JAIL.	1853.	1854.	1855.	1856.	1857.	1858.	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.
Average strength	457	308	264	319	357	473	474	310	321	370	443	409	408	622	524	499
Daily Sick per cent. of average strength ...	Unable to give the average for these years.										2·70	2·68	1·67	1·77	1·52	1·40
Admitted into Hospital of average strength ...	140·26	187·01	168·56	167·40	98·88	79·92	78·06	126·77	69·78	102·70	57·33	110·02	62·08	54·98	33·96	30·86
Ditto Ditto Ditto for disease of the bowels.	37·42	32·79	36·36	32·60	20·16	40·79	17 93	36·77	26·79	35·40	15·12	12·95	10·04	11·57	5·34	5·81
Ditto Ditto Ditto for fevers*	19·25	32·14	54·54	65·83	29·41	27·06	22·78	34·19	19·31	25·67	18·05	13·93	8·33	3·53	8·77	7·80
Died per 1,000 of average strength from all causes	26·30	29·20	121·20	90·90	70·00	57·10	61·20	96·70	87·20	72·90	36·10	66·00	29·17	65·92	17·10	14·00
Ditto Ditto Ditto from cholera ...	4·40	3·20	64·40	......	5·60	2·10	6·30	35·40	6·20	......	......	39·10	16·67	4·82	......	4·00
Ditto Ditto Ditto from all other causes.	21·90	26·00	56·80	90·90	64·40	55·00	54·90	61·30	81·00	72·90	36·10	26·90	12·50	61·10	17·10	10·00

* Exclusive of eruptive fevers.

POLICE.	1866.	1867.	1868.	Population in 1868.	Ghatwalls.	1867.	1868.
Average strength	651	666	671	Population 600,000	Strength ...	7,232	7,232
Daily sick per cent of average strength	2·13	2·16					
Deaths per 1000 of the average strength	21·50	18·01			Deaths per 1000 of average strength.	28·62	12·99

Registration fo Deaths for 1868.—*Bancoorah District.*

MONTHS.	Male.	Female.	Total.
May	250	209	459
June	281	220	501
July	425	370	745
August	266	294	560
September	265	271	536
October	121	71	192
November	......	......	......
December	......	......	......
Total	1,608	1,435	3,043

PHYSICAL CHARACTERS.

"The sub-soil water is generally found about 15 or 20 feet below the surface.

As the ryots of this district entirely depend upon the direct fall of rain, and as no special means of irrigation has been provided, and the ryots themselves entirely neglect to take any precautionary measures for the supply of water in the event of a drought, of course, the crops must suffer considerably, as was the case in 1864; and the result was the terrible calamity of 1866.

There are numerous tanks in and about the various towns and villages, that are a constant source of disease. These should be filled up or cleansed."

Table of temperature from 1863.—*Bancoorah District.*

Months.	1863.	1864.	1865.	1866.	1867.	1868.
January	68°	61°	69°	67°	66°	66°
February	79	70	75	74	74	79
March	82	75	82	84	81	84
April	85	86	87	87	88	87
May	88	88	86	90	90	89
June	87	86	84	87	88	87
July	85	87	85	83	84	85
August	82	86	84	85	84	84
September	81	82	84	84	84	83
October	78	68	78	75	77	80
November	71	66	72	73	72	73
December	60	64	65	61	64	68

Table of rain-fall from 1863.—*Bancoorah District.*

Months.	1863. Inches.	1864. Inches.	1865. Inches.	1866. Inches.	1867. Inches	1868. Inches.
January	·0	·0	·0	1·45	1·25	·50
February	·50	·0	1·10	7·25	·30	·80
March	·0	·30	2·30	·55	1·12	·0
April	·40	·90	4·40	2·20	·85	3·00
May	3·45	3·70	3·90	1·60	1·05	2·75
June	12·10	4·80	15·80	15·05	5·70	15·25
July	11·70	9·50	15·85	16·00	15·15	6·55
August	19·30	9·50	6·80	10·85	12·25	15·30
September	9·30	9·20	10·0	8·95	6·05	17·10
October	3·65	1·05	·50	2·90	3·60	Nil.
November	·40	·0	·0	·0	0·70	Nil.
December	·0	·0	·0	·0	·0	Nil.
Total.	60·80	38·95	0·65	66·80	48·02	61·25

" I can give no more complete statistics, as I have not had the required instruments.

These observations were taken in the jail by the respective medical officers. I noted the particulars in my report on Sonamookhy.

In the cold season the atmosphere is particular cold, clear and bracing, the mean temperature being about 64° or 65°; in March, April and May the temperature rises to about 86°; in June, July and August, when it is sometimes extremely oppressive, the earth retaining so much heat, the temperature rises to a mean of 87°, and in September, October and November the mean is about 73°. Fogs are very seldom seen here, and the climate is particularly dry for Bengal. Intermittent fever makes its appearance in the southern and eastern parts of the district, generally in September, October and November, *i. e.*, at the end of the rains and beginning of the cold season."

IRRIGATION, CROPS, WELLS, &c.

" No portion of the district is irrigated.

About half the total area is under *dhân* cultivation, one quarter bears other crops and the remainder is jungle.

Tanks are very numerous in the town and villages, where they are of course deleterious, but none where they would be useful. There are very few wells indeed.

During the rains the sub-soil moisture is found at a depth of 17 or 18 feet, and in the cold season of 10 feet."

SANITATION, CONSERVANCY, &c.

" I have forwarded my reports on Sonamookhy and Bishenpore.

BANCOORAH STATION.—" This station is healthy, but the conservancy arrangements are not so good as they should be. The recommendations will suggest the faults. The Magistrate is the responsible person. No sanitary improvements have been made recently, but suggestions were made some time since.

The principal cause of malaria in this town is the number of small dirty tanks immediately about the houses. The station of Bancoorah is not very malarious, owing no doubt to the good drainage in some parts of the town."

" On the whole, I think the place is tolerably well drained. There are few parts where the drainage is imperfect.

The refuse of the town is taken into the jungles.

The offal of the slaughter-yard is not disposed of with sufficient care."

SPECIFIC DISEASES.

" Under this head I have given all I could in my report on Sonamookhy, the only place where an epidemic has occurred. Cholera, however, is now very bad there, but as yet I am unable to give any particulars. In fact after my report on the place, there would be very little to add, except as to the cause of the disease and mortality.

During the last year, we have had no epidemic of small-pox. In a few villages it occurred, and I believe it was occasioned by inoculation."

VACCINATION, INOCULATION.

One paid vaccinator ; and now the inoculators come to me for lymph, and vaccinate in the various villages. The following table shows the number vaccinated during the past years :—

Years.	Successful.	Unsuccessful.	Doubtful.
1860	29	132	...
1861	79	92	6
1862	195	213	...
1863	20	233	23
1864	76	221	41
1865	167	204	17
1866	259	404	14
1867	1,202	1,188	3
1868	605	502	4

" Rather less were vaccinated during the past year, owing to the decrease in the vaccine establishment.

Inoculation is not very much practised in this district, except around the village of Koociakale."

QUARANTINE, SANITARY POLICE.

" I believe that any system of quarantine in a district must be so loose as to render it perfectly futile if not annoying."

NATIVE PRACTITIONERS.

There are probably between three and four hundred *kobirajes* in this district. Each village contains at least one, and sometimes three or four. I have but little personal knowledge of them.

A great number of the *kobirajes* of this district are of the *boido* caste. These are the most educated men, and they undergo more or less training, that is to say, they study the following works, *Needan, Churruk, Bowbhat*, and *Chukrodutta*. The remainder are of mixed castes such as *Mistries, Kurmokars*, &c., &c., these latter are, as a rule, a very ignorant class of men, some of them read a little of the *Needan*, and then commence practice.

The following is the rate at which *kobirajes* charge :—

A Zemindar	...	Rs. 1
Merchant	...	Ans. 8
Tradesman	...	„ 4
Mechanic and Laborer		„ 2 and downwards

They sometimes treat the poor for nothing. Many of them are well off, and their monthly income varies from Rupees 5 to Rupees 100. There are a few who make considerably over Rupees 100 per mensem. In the Burdwan District at a place called Mankur, one *Kobiraje's* income is Rupees 500 per mensem.

Secretly they have great faith in European treatment for acute diseases. I have often had them under my treatment. At Sonamookhy, during the fever, I had two, and the whole of their families.

They often use castor-oil, and quinine, but endeavour to keep the fact a secret. *Kobirajes* have more regard for European Surgery than medicine, probably, because the former is less likely to touch their pockets. They endeavour to make people believe that European treatment can only remedy acute diseases, but that for chronic ones it is useless.

"These men do incalculable mischief by the abuse of mercury, &c. They give it for almost every disease, and for fever they starve their patients for the first eight days. They never by any chance give an aperient at the commencement of fever. In fact, they are a perfect curse to society. I have over and over again seen cases of most glaring *malpraxis* when too late to remedy.

The effects of their treatment is often seen in syphilis, when they are wont to mercurialize a poor anæmic creature suffering from a soft chancre."

24. RANEEGUNGE.

THE REPORT HAS BEEN FURNISHED BY DR. ROBERTS, IN MEDICAL CHARGE.

" Raneegunge—*Longitude* 87° „ „ *East.—Latitude* 23° 3′ 3″ *North.*

Its elevation, above sea level, is 320 feet (the level of the rails at the Railway Station.) It is in the Bancoorah District, Division Burdwan. It is comparatively a new place, having been only a small village up to the date of the opening of the Railway to it from Calcutta, in 1855, when it became the *terminus* from which passengers for the north-west started, and remained so for many years. At the time of the Sonthal rebellion in 1855, barracks were built for European and Native troops on high grounds to the north of Raneegunge; and these were greatly extended on the breaking out of the mutiny in 1857. These barracks were demolished, and there ceased to be an European Depôt at Raneegunge in 1862. The Jail and Cutcherry of the Sub-division were at Mungulpore (three miles to the south-east of Raneegunge) until 1857, when they were removed to Raneegunge, the name of the Sub-division being changed, at the same time, from Mungulpore to Raneegunge.

III. I consider Raneegunge a healthy place—but much disease is imported into it by pilgrims, who rest here on their way to Juggernath, and by coolies brought to our emigration depôts *en route* for the tea districts, from Chota-Nagpore.

IV. Raneegunge seems to have always been tolerably looked after sanitarily, owing to its having always contained European troops, from 1855 to 1862.

VIII. There are no diseases peculiar to the district; neither leprosy nor elephantiasis are as common here as they are in the plains lower down in Bengal. The Police report that elephantiasis prevails in a village of the

Sub-division called Acheepoor. I have had no leisure to visit the place, and can neither confirm the statement, nor give any reason for the reported exceptional prevalence of the disease at that place.

"There was no small-pox at all in the station last year. Cholera prevailed rather exceptionally, as stated in my letter of 22nd June 1868, to the Deputy Inspector General of Hospitals, Presidency Circle, (a copy of which was sent to the Sanitary Commissioner.) It is seldom that there is not cholera at Raneegunge before the end of February, and there are usually cases occurring during March and April. It is rare for cholera to prevail during the rains. In the jail there was one case of cholera in March 1865, which recovered. During 1866 (the famine year) there were three cases (the 1st on the 2nd March) all fatal, in March; and in August, six cases, five of which were fatal (there were great numbers of starving people in Raneegunge in August, attracted by the relief operations.) During 1867 and 1868, no case of cholera occurred in the jail, though there was cholera outside. The immunity of the prisoners may partly be due to their drinking no water, except that of the well within the jail walls, but not wholly, as fresh prisoners are constantly being committed from the outside community. Of the Police Force numbering 195, cholera attacked three, early in April 1868, of whom one died; and four in June, (after heavy rain,) of whom two died. My letter above referred to described the disease as regards the general public. It appeared first, late in February, in the bazaar, imported, as usual, by pilgrims, and there were cases occasionally during March, April and May. During this period, twenty-two were treated at the charitable dispensary (mostly pilgrims) of whom ten died. The disease appeared amongst nearly all the numerous coal mines in this district, but was not very fatal at any, and did not remain long, except in the Raneegunge mines of the Bengal Coal Company, where it lingered for more than two months, as in the bazaar. It was also very fatal in the part of the Sub-division bordering on Maunbhoom. The disease had apparently disappeared in the latter half of May from the bazaar, but, in the beginning of June, it began to spread again, and there were six deaths from the 2nd to the 6th; on the 7th, nearly seven inches of rain fell, and some continued subsequently to fall daily till the 18th, by which time 19·42 inches had fallen—nearly a third of the total rain-fall for 1868. The mean temperature during that period was 79°34 and the daily range 2°·3. At first, the rain seemed to have caused the disease to abate, but from the 12th it spread very rapidly, (and several persons died daily,) reaching its acme on the 16th, when ten died. From this time it gradually abated, and had quite disappeared by the end of the month. Contemporaneously with the outbreak in the bazaar, the Bengal Coal Company's coolies at the Raneegunge mines were again, attacked, though all the other mines in the neighbourhood escaped. Three Europeans were seized with cholera after the 12th, and two died. The first case was that of a Station Master who was brought up to Raneegunge in a dying state from Undul, six miles from here, on the 12th. A woman who had not been near him was seized, on the 17th, in the Railway barracks, but recovered. But, on the 26th a woman who had nursed him during his attack, and who had been seized with diarrhœa immediately after his death (as had every one who had been waiting upon him in a very close and small room in the Railway station) died of cholera on the 26th. The Station Master, first attacked, had his meals sent to him by this woman who was attacked, and died a fortnight after she had attended upon his death-bed. The water drunk by the Railway servants is conveyed in a conduit pipe from the Bengal Coal Company's tank, called Raibund, into a raised brick tank, when it is filtered through charcoal and sand before being served out. This Raibund tank out of which a very large number of miners and coolies draw their supply of water, receives the drainage of an extensive tract of country, and especially of a piece of sloping ground made use of by the bazaar people for voiding their excretions upon. There is no tank in Raneegunge which is not liable, during heavy rain, to have excrementitious matter swept into it, and tank water is what is drunk by an immense majority of the inhabitants and by all travellers. Indeed, though there is excellent well water to be had, the ordinary natives will drink the water of the filthiest puddles, rather than go to the least trouble to procure it."

"The Magistrate has warned the people not to drink tank water, and the Manager of the Bengal Coal Company has done the same with the people under him. But warnings are perfectly useless, for not only are the coolies, &c., too lazy to procure good water, but they actually have a prejudice against well-water. At this moment, whilst I am writing (March 2nd, 1869) there is cholera in the bazaar, and my own *khansamah* has two members of his family suffering from cholera, and confesses that he uses dirty tank water for drinking, though he knows my opinion as to its causing cholera."

"Intermittent fevers are not very prevalent. The Police suffer a good deal from them in September, October and November, owing to night exposure, and to their often being sent with treasure to distant stations, such as Loharduggah, through a *jungly* country. Europeans who have not previously been in fever districts, seldom suffer from them. Dysentery is not common, and hepatic diseases are much more rare amongst Europeans here than in Behar, say between Jumalpore and Dinapore. Hepatic abscess is very common between these places, inclusive. The experience of Dr. Bird of Howrah coincides with my own, as regards its frequency at Jumalpore, where there are over 500 European *employés* of the Railway."

THE JAIL.

	1866.	1867.	1868.
"Daily average strength of prisoners ...	56·73 ...	30·07 ...	30·98
" " number of sick ...	2·13 ...	2·20 ...	1·81
Deaths	·17 ...	0 ...	0

THE POLICE.

Strength ... 195, exclusive of Government Railway Police.

AVERAGE DAILY SICK IN EACH MONTH.

	1867.	1868.		1867.	1868.
January ...	3·30	4·3	July ...	1·16	8·1
February ...	0·9	3·7	August ...	3·16	5·3
March ...	1·25	3·9	September ...	4·00	5·0
April ...	2·50	4·8	October ...	6·00	6·50
May ...	2·70	5·1	November ...	6·90	5·8
June ...	1·63	5·7	December ...	3·11	2·8

DEATHS.

1867.		1868.	
2nd June ...	1 Dysentery.	April ...	1 Cholera.
4th August ...	1 Remittent Fever.	June ...	2 Ditto.
7th September ...	1 Ditto.		

The people look healthy and they are prosperous. The coal mines and the Railway give employment to very large numbers of people, mostly from Chota-Nagpore *Dangurs, Coles, Sonthals, Bouries, &c.,* The public health is now, as always, good, except that cholera visits the people every spring. The agricultural population is sparse, owing to the poorness of the soil, and the large proportion of strong barren land. The coal miners who work underground are strong, muscular men, well paid and well fed. They eat meat, and drink as much rice spirit as they can get. In fact they are great drunkards."

METEOROLOGY.

"There is no barometer supplied to Raneegunge, and only a common thermometer. The rain-gauge is a float one, it is placed in an open space, and is raised six feet from the ground. The temperature is taken twice daily—at sunrise and at 3-30 P. M. The rain-fall has been taken from January 1867, and the temperature from August 1867. The observations were taken by myself and Native Doctor "Abdool Juleel."

Temperature.

	1867.			1868.		
	Minimum sunrise.	Medium.	Maximum 3·30 P. M.	Minimum.	Medium.	Maximum.
January ..	......	......	......	55°48′	65°22′	74°96″
February ..	......	......	......	59·41	67·65	75·89
March ..	......	......	......	67·48	76·65	86·03
April ..	......	......	......	76·10	82·20	94·30
May ..	......	......	......	77·55	85·85	94·16
June ..	......	......	......	79·33	83·26	87·20
July ..	......	......	......	79·93	83·83	87·74
August ..	80°19″	82°63″	85°06″	79·64	83·45	87·25
September ..	79·96	82·78	85·60	78·86	81·44	84·03
October ..	73·45	79·00	84·58	71·87	78·80	85·74
November ..	63·33	70·33	73·33	61·76	70·16	78·56
December ..	54·00	64·00	74·00	55·45	63·36	71·28

Rain-fall.

	1867.	No. of days on which rain fell.	1868.	No. of days on which rain fell.
January	0°60′	3	80°17′	3
February	0·40	3	0·88	3
March	1·35	6	0·40	1
April	1·00	3	0·60	4
May	3·33	4	2·40	7
June	7·90	12	20·89	15
July	17·75	20	6·98	11
August	14·60	22	12·97	18
September	11·50	18	13·05	19
October	4·65	9	1·05	1
November	0·70	3	0·0	0
December	0·0	0	0·0	0
TOTAL ..	63·78	93	59·39	82

"The chief peculiarity during the past year, was that about a third of the whole rain-fall of the year fell during the thirteen days in June, from the seventh to the eighteenth,—*much too early for the rice crops.* From the 19th June till the 31st July, little more than seven inches fell. The rice crops were consequently much below the average.

The climate is much drier than that of the alluvial plains of Lower Bengal, than that of Burdwan for instance; it is extremely hot in March, April and May, and hot Westerly winds blow often. But the rainy months are much drier and less humid and oppressive, and, no doubt, healthier. The rain ceased on the 2nd October, and there was none during the rest of the year."

IRRIGATION, CROPS, WELLS, &c.

"The average depth of the wells is thirty feet. They are *pucca* wells, not dug deep enough; they occasionally become dry. Dug tanks are rare; but natural tanks at the bottom of slopes are rather numerous.

Vegetation is not rich or plentiful, very few trees of any kind; what exist are the same as in Bengal generally.

The produce of the past year was below the average, and that of 1867 above the average. Rice is now sixteen seers for the Rupee. It was about thirty five seers this time twelve months."

SANITATION, CONSERVANCY, &c.

"The native town of Raneegunge is not large or of much importance, and it is of recent origin. It always contains a very large number of pilgrims and travellers. Raneegunge and its environs contains a large European and East Indian population, employed by the East Indian Railway Company, and by the coal proprietors. The Railway employés live on the company's own premises, near the Railway station. The Joint-Magistrate is responsible for the conservancy of the bazaar, employing an Overseer. There is no Municipality. The Railway Company undertake the conservancy of their own premises. The sanitary condition of the bazaar is satisfactory, there being broad and regular streets and *pucca* drains with good slopes, and no stagnant water. Conservancy carts remove all filth to a distance beyond the outskirts daily. Property is taxed for the conservancy, the Municipal Police, &c. The *pucca* drains (open) are extended as the station grows.

I can suggest nothing as likely to decrease sickness and mortality, except that the drinking of tank water be forbidden, and more wells dug for public use. I believe it impossible to protect the tanks against contamination during the rains, as all are more like lakes than tanks, receiving the drainage of higher land. Wells should also be made on the Railway premises, and the present supply of water from the Raibund tank cut off. The well water is very good and plentiful, the natives prefer tank water, however filthy, or at least, very few will go to the trouble of drawing water for themselves from wells. There are several public wells in the bazaar, and also many private ones. The public wells are clean and well kept, and protected by gratings.

The dwellings of the poor are just what they are all over Bengal, consisting of mud walls and a thatched roof. I consider the town well drained. The drainage flows down to lower ground, and finally into the Damooda, Raneegunge being on an elevated site.

No public latrines. Dry-earth system only adopted in the jail.

The dead are burnt, when the relatives can afford to burn them or care to do so. The vast majority of bodies are simply thrown away on some waste ground, about two miles outside Raneegunge.

Intemperance is universal amongst the miners, and very general amongst *palkee* bearers; and the *kalassies* and coolies and native mechanics in the service of the Railway Company. They drink rice spirits. I cannot tell to what extent it is a cause of disease or death.

The diet of the people is just that of Bengallees, especially the agricultural people. The coolies (mostly from Chota-Nagpore) eat meat, and will object to scarcely anything on the score of caste."

FAIRS.

"No Fairs."

SPECIFIC DISEASES.

"We have rarely much small-pox or endemic fevers, but owing to the enormous number of pilgrims always passing through, to and from Juggernauth, and to the emigration coolies recruited in Chota-Nagpore, who halt at the depôts here on their way to Calcutta, cholera is never absent in spring. It breaks out amongst gangs of coolies generally *en route* from, say, Ranchee, Hazareebaugh, Purulia &c.; before they reach Raneegunge they drink water from dirty puddles on the road side. I can give no statistics of vaccination. I annually get a large number of children (chiefly of miners) vaccinated by Native Doctors, and the parents do not object; indeed, this year they bring the children of their own accord."

25.—SOORY, BEERBHOOM.

THE REPORT IS BY DR. SHERIDAN.

" Soory.—*Latitude* 23° 54' *North.*—*Longitude* 87° 33' *East.*

Height above the sea, 233 feet.

I would strongly recommend that the provisions of the Municipal Act, in a modified form, be made applicable to the town of Soory, and all the large towns in the interior of the districts, where practicable, and that *zemindars* be made responsible, to a certain extent, for the sanitary condition of all villages in their estates, in so far as regards their cleanliness generally, drainage, ventilation, removal of jungle, and above all the preservation of the tanks from which the people obtain their drinking water, in a rigidly cleanly state.

There are no diseases peculiar to Soory or its vicinity, that I am aware of, but leprosy and elephantiasis may be said to be indigenous to the district, and are of frequent occurrence among the poor and most indigent classes, (and sometimes even among persons in comparatively comfortable circumstances,) residing in some parts of the interior of the district, more particularly in the hill : jungles and vicinity of the hills.

The only exceptional sickness that has occurred at Soory during the past year was :—

1.—An infectious form of endemic inflammatory congestive ophthalmia or catarrhal conjunctivitis; the disease prevailed very extensively in the town and neighbouring villages during the months of August and September, and attacked indiscriminately men, women and children, and even infants at the breast; the disease appeared to have been induced by an unhealthy state of the atmosphere.

2. A severe form of rubeola prevailed in the town from February to May, but there were very few deaths from the disease.

In different localities of the interior of the district, cholera, small-pox, and a severe form of fever prevailed.

Cholera.—This disease has been flying about the district during the months of March, April, May, July, October, November and December. Sudden violent out-breaks of a most virulent character have occurred during the months in question, in different localities simultaneously, or at short intervals, carrying off in a few hours a large number of those attacked, and then suddenly disappearing from one place, to re-appear in another, but in some localities it lingered for longer periods, and even visited the same place in some instances twice during the year.

At the commencement and termination of the rains and setting in of the cold season, disease is more prevalent than at any other periods, cholera and small-pox excepted.

During the first period, owing to the malarious exhalations arising from the slimy mud of partially or wholly dried-up tanks, shallow pools of stagnant, putrid water, impregnated with decaying organic matter, and overrun with rank, rotten vegetation, uncleaned and obstructed drains (where there are any) manure heaps, and holes filled with offal and filth of all kinds, all these on the first few falls of rain are converted into so many sources of putrefactive, seething fermentation, evolving deleterious gaseous odours and malarious exhalations of a most deadly character, which give rise to severe attacks of low remittent and intermittent fevers, diarrhœa, dysentery, and other forms of zymotic diseases. Prior to the setting in of the rains, moreover, the water in many of the tanks falls very low, and becomes unfit for drinking, and this too when, owing to the great heat of the weather, the want of good water is most felt; to the use of such water, taken in conjunction with the other local predisposing causes enumerated, may be ascribed much of the sickness which prevails among the poorer classes, and the endemic outbreaks of cholera that occur during the hot season.

Again, at the termination of the rains, the same morbific agencies come into operation with the same results, but to a much greater degree; low-lying marshy ground, and jungly localities, shallow pools of muddy, stagnant water, overgrown with rank vegetation, and dirty tanks of small depth, foul drains and heaps of filth saturated with moisture, &c., exposed to the powerful action of the sun's rays, gradually dry up, disengaging during the process, malarious exhalations and noxious mephitic vapours, poisoning the air in their vicinity, and exercising a most injurious influence on the health of all exposed to them; these prolific sources of unhealthiness are to be found to an unlimited extent within and around the native town of Soory, and of almost every town and village in the interior of the district, and are the cause of most of the sickness that prevails at this period of the year, such as low remittent and intermittent fevers, complicated with visceral congestions, particularly of the liver, bowels and spleen, and occasionally cholera, &c. It is really surprising how the people exist in the midst of so much contamination, and it would almost appear, as if, from having been accustomed and inured, to the various sources of disease mentioned, from their childhood, they had become insensible to, and had lost all susceptibility to their influence; in the same manner as those living in the concealed recesses of the most deadly Terai (the slightest exposure to the malaria of which proves so rapidly fatal to those unaccustomed to its pestilential influence) who, though anæmic, ghastly-looking spectres, yet contrive to live unscathed to a fair average age; but whenever epidemic disease breaks out among people laboring under circumstances so inimical to health, whether it be cholera, small-pox or fever, it then assumes a most virulent character, and as might be expected, is attended with fearful havoc, and rapidly numbers its hecatombs of victims, as it does under nearly similar circumstances when it breaks out in the overcrowded filthy villages of this or any other district in Bengal.

As the cold season sets in, in addition to the previously enumerated causes of sickness, may be mentioned the slow drying up of the rice fields in some years, and the sudden reduction and alteration of temperature; fevers then become more frequently complicated with inflammatory congestion of the thoracic viscera, and pulmonary and bowel complaints prevail among the most indigent, owing to the want of warm clothing, the dearness of fuel, and the consumption of new rice. Cholera also very often prevails at this season.

Thus, it may be said that at the commencement and termination of the rains, malarious fevers are the most prevalent, that cholera occurs at all seasons but prevails most generally in the hot season, and small-pox generally at the end of the cold season, *i. e.*, in the months of February and March, the months during which the native small-pox inoculators commence their operations. The most indigent, poverty-stricken, and filthy, in their habits such as. *Domes, Harees, Bowries, Dhangurs, Bagdees, Moochees*, &c., form the great bulk, of those who fall victims to disease and sickness, during the most unhealthy seasons of the year, which appears to be attributable to their poverty, the nature of their occupations, and their filthy, irregular and intemperate habits generally.

As regards caste, I believe that all, whether Hindoos or Mussulmans, suffer in an equal degree from ordinary prevailing diseases, as well as from cholera and small-pox, owing to exposure to the same predisposing local causes of disease, and the dirty habits of the lower classes of the people generally, but that the latter suffer more during epidemic outbreaks of small-pox from their greater neglect (and from prejudice in many instances) to submit to either vaccination or inoculation

XIII. The people are generally unhealthy looking, and for the most part anæmic, and attenuated in appearance, and are unequal to much prolonged labor or hard work; they are, moreover, very poor, and generally very idle."

"I cannot say whether Soory is improving or not in regard to the health of its inhabitants, conservancy measures have been too recently introduced, and to too limited an extent, to have much improved the sanitary condition of the town, or benefited the health of the inhabitants; but I believe, that owing to the increased prosperity of the cultivators of the soil, generally, who now obtain much better prices for their produce than formerly, particularly since the construction of the Railway in this district, there is less poverty, and less disease of an ordinary character; the large sums, moreover, expended on the Railway works during their construction, and the increased employment they afford to large numbers of the inhabitants, has also conduced to this result; but with regard to cholera, it seems, as already observed, to have become endemic in some parts of the district. To the local predisposing causes before mentioned, and not to poverty alone, may be ascribed, in my opinion, the frequent outbreaks of this disease that now so often occur in some parts of this district."

The population of Soory is reported as 6,500; of the district 743,685. on this point Dr. Sheridan writes:—

"These figures have been obtained from the Collector's Office I cannot say on what data they are based, I believe, the population has been calculated on an average of 4½ persons in each house."

The incidence of population to a square mile is 314.

Return of sick of the Beerbhoom District Police for the year 1868.

Beerbhoom, 1*st January* 1869.

Total number admitted into hospital.	Discharged cured.	Sick leave.	Died.	Remaining.	Average daily strength	Average daily number of sick.	Ratio per cent of sick to strength.	Ratio per cent of deaths to strength.	Ratio per cent. of deaths to treated.
149	136	8	3	2	251	3·861	42·421	0·854	2·013

Return of Sick of the Beerbhoom Jail for the year 1868.

Beerbhoom, 1st January 1869.

Total number admitted into hospital.	Discharged cured.	Transferred.	Liberated.	Died in hospital.	Remaining.	Average daily strength.	Average daily number of sick.	Ratio per cent of sick to strength.	Ratio per cent. of deaths to strength.	Ratio per cent of deaths to treated.	Died out of hospital, not included in the return.
258	225	1	9	14	9	301·994	10·618	85·432	4·632	5·422	1

"The slope of the district, judging from the course of the rivers, is from north-west to south-east; I cannot say what may be the extent of inclination.

Subsoil water is found on an average at the depth of twenty-two feet from the surface in, the dry season.

The natural surface drainage of the country is carried off by the different rivers and mountain streams, which traverse the district, and by numerous naturally formed drains, which discharge themselves into the former.

There are no shallow streams, no stagnant *nullahs* that I am aware of, and no swamps in the vicinity of Soory.

I consider many of the shallow tanks, which are never cleared out, a source of malaria and disease. I would suggest that they should be deepened and cleaned out once a year."

METEOROLOGY, CLIMATE, &c.

"The only meteorological instruments in use at this station, until within the last year, were, a dry and wet bulb thermometer, a rain-guage, and a wind-vane. A return of the temperature, rain-fall, and prevailing winds, for ten years, is appended, also for the past year.

Meteorological Return from 1851 *to* 1867.

SOORY, BEERBHOOM, 1ST JANUARY, 1869.

YEARS.	AT SUNRISE.		AT 10 A. M.		AT 4 P. M.		AT SUNSET.		Thermometer in sun's rays at 4 P. M.	Rain-fall.
	MEAN TEMPERATURE.		MEAN TEMPERATURE.		MEAN TEMPERATURE.		MEAN TEMPERATURE.			
	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.	Dry bulb.	Wet bulb.		
1851	78°67	73°65′	81°12′	76°35′	84°54′	78°25′	83°65′	79°37′	93°94′	30°44″
1852	77·30	72·79	79·80	75·43	82·60	76·40	81·73	76·10	93·99	68·60
1853	77·57	72·24	80·78	73·93	83·91	75·20	83·00	75·56	96·12	36·04
1854	76·69	73·15	79·92	74·79	.82·83	77·97	81·51	75·69	91·71	62·20
1855	72·09	73·02	81·56	75·49	82·75	77·03	80·93	76·19	97·92	58·90
1856	72·34	74·57	83·12	78·17	83·42	79·52	87·92	78·14	110·85	63·81
1857	70·68	71·58	82·41	76·66	82·59	77·00	83·00	76·37	113·07	50·55
1858	71·19	73·32	80·45	78·83	83·37	78·02	82·15	77·88	104·50	51·50
1859	70·15	74·35	79·79	76·35	82·24	77·94	81·86	76·20	102·16	52·84
1860	71·98	72·21	80·79	76·25	83·52	77·48	82·61	76·73	97·10	34·60
1861	71·29	74·67	79·71	75·65	82·60	77·75	81·14	76·22	89·97	53·05
1862	70·30	73·45	79·03	76·18	82·03	76·76	80·81	76·68	90·61	50·15
1863	70·47	75·34	79·86	76·18	82·47	77.53	81·14	77·20	92·11	49·35
1864	68·74	75·71	79·70	77 26	81·79	78·41	80·39	77·50	92·46	42·50
1865	68·79	76·70	80·33	79·23	81·95	78·94	80·36	76·34	92·30	46·10
1866	68·45	76·77	80·23	77·49	82·74	77·08	80·97	77·00	97·66	79·85
1867	69·97	65·77	80·65	76·75	82·87	79·05	82·41	79·01	93·84	56·30
1868	...	...	...	...	...	...	...	...	...	65·80

The average temperature of the hot season (*i. e.*, from March to May inclusive) during the 24 hours, taken at sunrise, 10 A. M., 4 P. M. and sunset, calculated for a period of 10 years, *i. e.*, from 1858 to 1867 inclusive is: ... ... 84·06

The Maximum temperature at 4 P. M. ... ... 95·53

„ Mininum temperature taken at sunrise ... ... 66·46

„ Average temperature of rainy season ... ... 84·55

„ Maximum temperature at 4 P. M. ... ... 89·46

„ Mininum temperature at sunrise .. ... 76·8[illegible]

„ Average temperature of the cold season ... ... 68·37

„ Maximum temperature at 4 P. M. ... ... 75·53

„ Mininum temperature at sunrise ... ... 66·46

„ Average temperature throughout the year ... ... 77·25

		In.
The average annual rain-fall during the same period	...	52·26
„ Greatest rain-fall in any one year	...	79·85
„ Least ditto	...	34·60
„ Prevalent wind during the hot season	...	W. S-W.
„ ditto ditto rainy season	...	S-E.
„ ditto ditto cold season	...	N-W.

Meteorological Record at Soory, Beerbhoom, for the year 1868,

1st January 1868

MONTHS.	AT 9·30 A. M.				AT 9·30 A. M.				AT 3·30 P. M.			
		THERMOMETER.								THERMOMETER.		
	Barometer.	Dry bulb.	Wet bulb.	Direction of wind.	Maximum.	Mimium.	Mean.	Rain-fall.	Barometer.	Dry bulb.	Wet bulb.	
		°	°		°	°	°	In.		°	°	
January ...	...	65·93	59·51	N-W.	70·09	49·38	59·73	0·10	...	69·90	60·93	N
February ...	...	69·65	61·93	Calm	75·06	51·20	64·48	0·60	...	73·00	63·65	N
March ...	29·80	86·18	68·32	N-W.	92·12	63.93	77·98	..	29·75	90·65	70·03	N
April ...	29·68	88·80	73·56	S-W.	99·06	74·13	87·23	0·26	29·62	97·23	71·86	N
May ...	29·67	87·51	76·93	S.	101·70	78·64	88·90	2·54	29·60	94·70	75·19	
June ...	29·43	86·13	79·33	E.	96·80	79·06	87·93	8·85	29·39	88·86	79·86	
July ...	29·45	86·25	80·38	S.	95·80	79·16	87·50	8·85	29·11	89·50	81·41	S-
August ...	29·46	85·32	82·32	S.	93·70	78·51	86·45	10·44	29·42	88·41	81·06	V
September ...	29·57	84·26	80·10	Var.	91·66	78·40	85·00	9·20	29·56	85·76	80·76	V
October ...	29·75	83·77	74·93	N-E.	91·76	71·09	82·21	0.40	29·71	88·38	74·22	N
November ...	29·84	74·66	64·63	N-W.	84·50	63·33	72·50	...	29.79	81·70	67·36	N-
December ...	29·96	69·25	54·40	N-W.	79·19	53·35	66·25	...	29·91	77·45	59·67	N-
Mean ...	29·66	80·69	71·69	...	89·28	68·59	79·24	41·24	29.61	85·46	73·16	.
Mean of last year ...	...	80·65	76·75	...	...	...	...	55·80	..	82·87	79·05	..

The observations were taken last year at the jail hospital by t native doctor."

The only peculiarity calling for notice during the past year was excessively cloudy, close and sultry state of the weather, and a constai slight drizzling rain, daily, in the month of September; the almost to absence of heavy falls of rain, and the high winds and thunder storms usı at the setting in and breaking up of the rains; and the early cessation of t rains in September.

The chief characteristic of the climate of Beerbhoom is its extreme dryness, in which respect it resembles that of the Upper Provinces, but it is neither so hot nor so cold. It is very salubrious, except at the change of season, particularly at the termination of the rains, when sickness of an ordinary character, and principally fevers of a remittent and intermittent type prevail, as already mentioned. During the hot season, however, and beginning of the cold, outbreaks of cholera frequently occur, and small-pox at the end of the latter season, when the native small-pox inoculators commence their operations, and sporadic cases occasionally occur at other seasons; but a great deal of the sickness that occurs among the people, is due more to local predisposing causes of their own creation than to climate.

The season is on the whole very healthy, the prevailing winds are south-west and south-east.

During the rainy season, the weather is for the most part very cloudy, and frequently oppressively close and sultry, owing to the prevalence of calms with a stagnant state of the atmosphere, surcharged with moisture; it is, however, much less relaxing and enervating than in other districts of Bengal possessing a damper and more moist climate, and is on the whole healthy, except at its commencement and termination as already observed, and very agreeable, during the prevalence of fresh southerly winds with heavy falls of rain at short intervals.

The prevailing winds are southerly and principally south-east and south-west.

" The cold season, from November to February, inclusive (towards the middle of the latter month it begins to feel warm, but not oppressively so) is very delightful, moderately cold, and bracing, the thermometer rarely falling below 45° or rising higher than 75° in the shade, throughout the twenty-four hours. The nights, however, and the mornings before sun-rise in the month of January, are sometimes very cold ; piercing and chilly, during the prevalence of the easterly winds, which sometimes blow for short intervals at this season; but the climate on the whole is most salubrious and invigorating, and equal to any climate of Europe, with one drawback, the almost total absence of vegetation on the ground, owing to the great heat of the sun's rays, and the dried up state of the soil, particularly towards the end of the season, as the only green spots to be seen are a few irrigated sugar-cane fields and garden plots.

Those of robust sanguineous constitution suffer most during the hot season, from inflammatory visceral congestion of the lungs and liver, &c., with ardent symptomatic fever, neuralgic affections, &c., while those of feeble lymphatic, constitutions suffer most in the rains and cold season from low fevers cachectic, splenic disease, and dropsical effusions, rheumatic affections, bowel and pulmonary complaints, &c."

Food is on the whole cheap.

The produce of the past year is below the average of favourable years owing to the early cessation of the rains in September.

Blight of crops never occurs in this district."

SANITATION, CONSERVANCY, &C.

"The sanitary condition of Soory is any thing but satisfactory, and very little has been done to improve it, many sources of unhealthiness exist, which are susceptible of removal. The conservancy arrangements owing to the want of sufficient funds are of a most limited character.

The Magistrate, and a committee composed of native gentlemen, residents of the town, were responsible for its sanitation and conservancy, but the committee was dissolved, and the Magistrate is now I believe, alone responsible for both.

I fear no real interest is taken in the subject by those whom it more nearly concerns, that is the people themselves, and the native gentlemen who have been appointed to carry out the necessary sanitary and conservancy improvements; but this is a task of no easy accomplishment where sufficient funds for the purpose are not available, and it is on this account that I have for years advocated and most strongly urged and recommended the introduction, in a modified form, of the provisions of the Municipal Act.

No sanitary improvements have been lately proposed or effected.

I would beg to suggest the following improvements as the best calculated to lessen sickness and mortality in the station and district.

1. The deepening and cleansing of the tanks, the setting apart some for drinking water, some for bathing and ablution, and others for *dhobees'* use exclusively.

2. The cleansing and improving of old drains and the construction of new ones where most required."

3. "The filling up of all shallow and deep holes, or other receptacles containing foul stagnant water, and all hollows or inequalities in the ground.

4. The removal of all jungle and rank luxuriant vegetation around tanks; and, in the vicinity of the town, of fallen dilapidated mud houses, the walls of which form convenient screens for the concealment of dirt and rubbish of all kinds.

5. The improvement of the ventilation of the town by the widening of narrow *gullies* or lanes.

6. The enforcement, as far as practicable, of the construction of houses and huts, to be hereafter erected, on a proper plan; further, that all persons be strictly prohibited from digging holes near their houses.

7. The prohibition of accumulations of manure, offal or dirt, of any kind near their houses.

8. That a proper construction of cattle-sheds, with a due regard to ventilation, and the daily removal of dung and all other sources of contamination, be strictly enforced.

9. That all the streets, *gullies*, and drains in the town be swept and cleansed daily, and that night-soil and filth of all kinds be removed to a distance from the town and deposited in deep trenches on the *maidan*, and the dry earth conservancy system be strictly enforced.

10. Effectual cremation and interment of dead bodies at a proper distance from human habitations.

11. The prohibition of shambles and slaughter houses within the precincts of the town, and their removal to a proper distance beyond it.

12. The construction of public latrines and urinals at convenient places, within and without the town, with responsible establishments to preserve them in good order, and in a cleanly condition, and the rigid enforcement within them of the dry earth conservancy system.

13. The prohibition of storing hides, horns, or other articles capable of emitting offensive effluvia within the town.

14. The punishment of all persons found committing nuisances on the public ways, in the drains, or within the boundaries of tanks of anykind."

15. "The punishment of persons selling unwholesome, damaged or adulterated articles of food.

16. Regulation of weights and measures, and punishment of persons using false ones, and the testing of their accuracy at uncertain times.

There are no local circumstances especially inimical to health, other than those already mentioned, except perhaps a distillery in the town, which emits offensive effluvia while working.

The drinking water when obtained from pure and uncontaminated sources is excellent. I consider that which is obtained from clean wells and tanks, of proper depth, wholesome. The water generally, has not been analysed.

The natives consider it excellent, but they are not very particular as to whether the source from which they obtain it is pure or otherwise. The supply is abundant, but not pure or free from contamination. Towards the end of the hot season, and particularly in years when the rain-fall has been much below the average, the water in many of the tanks falls very low, and becomes impure and utterly unfit for drinking.

The water as already observed is obtained almost in every instance from *cutcha* tanks, and very rarely from wells of the same description.

The depth of the tanks varies very much; the average is about twenty-four feet; neither tanks nor wells are kept in a cleanly state.

The tanks, particularly within and in the vicinity of the town, are generally in a dirty state, and many of those on the *maidan* equally so. Many of them are subject to contamination from animal and vegetable impurities, and such contamination is, in my opinion, in many instances both direct and by percolation.

Surface drainage does pass into some of the tanks from which drinking water is obtained.

They are not surrounded by walls, but for the most part by high earthen embankments. There are no drains around them, at least I have never seen any."

" The wells are not protected by a grating or any other covering.

The source of water supply is never, I believe, cleaned out, and certainly not systematically.

No means are adopted for preserving the purity of the water.

On the whole, I consider the drinking water impure, though not unclean in appearance, generally; the sources of pollution are" :—

1. The practice of bathing in the tanks and washing the clothes worn when bathing; and also cleaning cooking utensils in them.

2. The disgusting practice, common among natives, of complying with the calls of nature within the embankments of tanks, and often close to the water's edge.

3. The admission of surface drainage, in some instances, into the tanks.

4. The contamination of wells by percolation, owing to the accumulation of filth and manure, &c., on the ground in their vicinity.

The average width of the principal streets, of which there are three, varies from 20 to 24 feet, that of the lanes from 6 to 16 feet. The principal streets are kept tolerably clean during the dry season; the narrow lanes are dirty at all seasons, and particularly so in the rains.

In the principal streets there are *pucca* drains, which terminate in *cutcha* ones, and often become obstructed by earth and rank vegetation; they are incapable of conveying away to any distance the drainage water, so that it lodges in its passage to the *maidan*, where these drains are supposed to empty themselves. One of these *pucca* drains, situated on one side of one of the principal streets, empties itself into a large tank at the southern extremity of the town; some of the lanes have surface *cutcha* drains, and others none at all.

The depth of the *pucca* drains varies from 1 to 4 feet.

I do not consider the town properly drained—some of the drains are too deep, and should be made more shallow if the fall will admit of it, and all should be prolonged to a greater distance from the town, and made, if considered advisable, to empty themselves into a main drain, which would carry the drainage of all to a certain part of the *maidan* at a distance from the town; or the *cutcha* drains, in which some of them terminate, should be widened and deepened, and well paved or consolidated, at bottom and to a certain height on either side, with a cement or composition of *kunkur* grave and lime."

Trenches are not dug for the reception of ordure, excrementitious matter is allowed to remain unburied. The excreta of sick persons are not disposed of with any special care.

All filth, with the exception of human ordure is mixed with the manure of cows and stable-litter, &c, and preserved for the purpose of manuring the land previous to the sowing of the rice crop, &c. The general conservancy system at work is as follows:—

There are four *methers*, who sweep the main streets of the town to a very limited extent each morning, and the sweepings are conveyed to the *maidan* by two conservancy carts; this is the only conservancy system at work, and it is under the direction of the Police.

Animals are killed at two places, one situated to the north, and within the precincts of the town, the other to the south, and on the boundary of the town.

These slaughtering places are quite close to the dwellings of the people residing in their vicinity.

The carcases are cut up and removed for sale to shambles or standings in the town, the offal of the slaughter-yard is deposited on the bank of a tank situated to the North, and about ¼ of a mile distant from the town."

OBNOXIOUS TRADES, NUISANCES, &C.

" A distillery in the town is I believe, the chief and only nuisance, and principally to those living within the influence of the offensive effluvia emitted by it when at work.

The general atmosphere is often tainted in certain states of the weather, more particularly in dirty overcrowded parts of the town, and more especially in the evening, when the male portion of the population sally forth to waste pieces of ground, the *maidan*, and tanks situated within or in the vicinity of the town, for the purpose of complying with the calls of nature; and at certain seasons by offensive emanations and noxious exhalations from pools of foul stagnant water, manure heaps, and receptacles of dirt and offal."

" Unpleasant odours are often perceptible in many places, partly owing to emanations from the soil, in some instances to foul uncleared drains, but principally to localized sources of contamination resulting from the dirty habits of the people.

Intemperance is common among the lowest classes."

SPECIFIC DISEASES.

" None of the diseases enumerated can be considered as being endemic at Soory, and as to epidemic disease, with the exception of small-pox and cholera, none of them have prevailed epidemically at Soory during the fifteen years that I have resided there.

Climate in itself, at least in this district, has less to do with the prevalence of disease, than poverty and privation, and above all the filthy, reckless and imprudent habits of the lower classes, among whom disease principally prevails."

EPIDEMICS.

" Small-pox and cholera are the only diseases that have prevailed epidemically at Soory during the fifteen years I have resided at the station. The former in 1867, the latter, of which no returns were furnished, at different periods.

Small-pox—origin.—It was stated to have been brought to the station from a Sub-division of the district of Burdwan, by a person who had gone there to visit a friend ill of the disease.

The first cases of the disease occured in the month of December 1866.

The disease spread in all directions from Soory, as a *focus*, to all parts of the district.

It was most virulent in the most filthy and crowded parts of the town.

The extent of sickness and degree of mortality it occasioned at Soory is shown by the following returns :—"

Return No. 1 shows the number of persons who have been attacked with small-pox in each month, and the number of deaths and recoveries.

No. 1.

1867.	Remained.	New cases.	Total.	Recovered.	Died.	SEX OF THOSE WHO DIED.				Remaining.	Total amount of population.
						Men.	Women.	Boys.	Girls.		
February ...	80	80	160	22	44	4	16	14	10	94	7,725
March ...	94	144	238	66	84	17	22	20	25	88	
April ...	88	181	269	149	63	18	12	18	15	57	
May ...	57	17	74	62	9	2	0	3	4	3	
Total ...	80	422	502	299	200	41	50	55	54	3	

Ratio per cent of sick to total population	...	6·948
„ of deaths to ditto	...	2·768
„ of ditto to sick	...	39·840
„ of recoveries to ditto	...	59·760

No returns of sick were received prior to the 14th of February, up to which date, it is stated, that seventy-three deaths had occurred, which are not included in the foregoing return, and which will make the total number of deaths, 273, and the ratio per cent of deaths to total of population 3·778 during the six months the disease prevailed.

Return No. 2, shews the number of patients treated in the small-pox hospital from the 2nd March to the 31st May 1867.

No. 2.

	Admitted.	Cured.	Absconded.	Died	Remaining.	Total.
Confluent Small-Pox	14	4	2	8	0	14
Discrete ditto	8	8	0	0	0	8
Total	22	12	2	8	0	22

"The epidemic prevailed from December 1866 to the 15th May 1867.

The disease began to subside during the month of May, and totally disappeared in the month of June 1867.

Cholera has been prevalent in different localities of the interior of the district, during the months of March, April, May, June, July, October

" Unpleasant odours are often perceptible in many places, partly owing to emanations from the soil, in some instances to foul uncleared drains, but principally to localized sources of contamination resulting from the dirty habits of the people.

Intemperance is common among the lowest classes."

SPECIFIC DISEASES.

" None of the diseases enumerated can be considered as being endemic at Soory, and as to epidemic disease, with the exception of small-pox and cholera, none of them have prevailed epidemically at Soory during the fifteen years that I have resided there.

Climate in itself, at least in this district, has less to do with the prevalence of disease, than poverty and privation, and above all the filthy, reckless and imprudent habits of the lower classes, among whom disease principally prevails."

EPIDEMICS.

" Small-pox and cholera are the only diseases that have prevailed epidemically at Soory during the fifteen years I have resided at the station. The former in 1867, the latter, of which no returns were furnished, at different periods.

Small-pox—origin.—It was stated to have been brought to the station from a Sub-division of the district of Burdwan, by a person who had gone there to visit a friend ill of the disease.

The first cases of the disease occured in the month of December 1866.

The disease spread in all directions from Soory, as a *focus*, to all parts of the district.

It was most virulent in the most filthy and crowded parts of the town.

The extent of sickness and degree of mortality it occasioned at Soory is shown by the following returns :—"

Return No. 1 shows the number of persons who have been attacked with small-pox in each month, and the number of deaths and recoveries.

No. 1.

1867.	Remained.	New cases.	Total.	Recovered.	Died.	Sex of those who died.				Remaining.	Total amount of population.
						Men.	Women.	Boys.	Girls.		
February ...	80	80	160	22	44	4	16	14	10	94	7,725
March ...	94	144	238	66	84	17	22	20	25	88	
April ...	88	181	269	149	63	18	12	18	15	57	
May ...	57	17	74	62	9	2	0	3	4	3	
Total ...	80	422	502	299	200	41	50	55	54	3	

Ratio per cent of sick to total population	...	6·948
„ of deaths to ditto	...	2·768
„ of ditto to sick	...	39·840
„ of recoveries to ditto	...	59·760

No returns of sick were received prior to the 14th of February, up to which date, it is stated, that seventy-three deaths had occurred, which are not included in the foregoing return, and which will make the total number of deaths 273, and the ratio per cent of deaths to total of population 3·778 during the six months the disease prevailed.

Return No. 2, shews the number of patients treated in the small-pox hospital from the 2nd March to the 31st May 1867.

No. 2.

	Admitted.	Cured.	Absconded.	Died	Remaining.	Total.
Confluent Small-Pox	14	4	2	8	0	14
Discrete ditto	8	8	0	0	0	8
Total	22	12	2	8	0	22

"The epidemic prevailed from December 1866 to the 15th May 1867.

The disease began to subside during the month of May, and totally disappeared in the month of June 1867.

Cholera has been prevalent in different localities of the interior of the district, during the months of March, April, May, June, July, October

November and December, but there have been no cases that I am aware of among the population of the town, and only one case in the hospitals under my charge, which proved very rapidly fatal, and occurred during my absence on leave. The patient was a Police Constable, who it appears had had no communication with any infected place or persons."

SUGGESTIONS.

"I would suggest, as the most effectual means, in my opinion, of controlling the spread of cholera, and of all diseases:—that the provisions of the Municipal Act, in a modified form, be made applicable to the town of Soory and to all large towns, or Sub-divisions of the district where there is no large town, and that zemindars be made responsible for the sanitary conditions of all villages on their estates, with a view to the removal of all the local predisposing causes of the disease, by the enforcement of a proper system of conservancy.

4. The distribution of printed notices among the people, indicating the precautions necessary to be observed in outbreaks of the disease for their own preservation, something similar to the one which I have had posted up in the most public parts of the town, and a copy of which I here append":

1. "NOTICE.—*Cholera and Bowel Complaints.* As cholera of a very virulent character has broken out in different districts of Bengal, and at some places in this district, even at Soory, the inhabitants are hereby informed, that cholera medicines will be at all hours available or ready at the thannah, and charitable dispensary, with instructions for their use whenever applied for.

2. As looseness of the bowels, if not speedily checked, is apt to end in cholera, the moment an individual becomes so affected, he should apply without a moment's delay for relief at the charitable dispensary.

3. All should be careful to abstain from the use of unwholesome articles of food, bad water, and above all, to keep their houses scrupulously clean and well aired, and to remove all accumulations of dirt in and around them, to a considerable distance, as good food, cleanliness and pure air, with avoidance of exposure to excessive heat, or to the damp dews and exhalations between sun-set and sun-rise, are the best safeguards against cholera.

4. The Civil Surgeon attends daily at the charitable dispensary, and the native doctor is at all hours present, so that any one applying for medicine will be immediately supplied at any hour of the day or night."

FAIRS.

"Fairs are held at the following places in this district:—

At Bukressur	in February or March, average number of persons	15,000
„ Burchandpore	in January	6,000
„ Tarapore	in October	5,000
„ Kendoolee	in January	20,000
„ Bhasture	in April	5,000
„ Soopore	in December	5,000

In a reply obtained from the Magistrate's Office, it is stated that cholera has been brought, in some instances, into the district, by pilgrims attending those fairs; no fact, however, corroborative of the statement, has been adduced, but I know from my own experience, that both cholera and small-pox have been brought into the station by pilgrims passing through it, on their way to visit the Hindoo temples at Deoghur, where a large fair is held in the month of February or March, which is attended by pilgrims and native merchants from the most remote parts of India, indeed, formerly their advent was sure to be the forerunner of an outbreak of cholera, at a large village close to the town, where they took up their quarters, which some times extended to the inmates of the jail. At my suggestion, however, some years ago, they were interdicted from passing through Soory, and they have been ever since compelled to take a more circuitous route by the Grand Trunk Road, with the anticipated result, *viz.*, the non-appearance of the disease at the station during the months they were formerly in the habit of passing through it."

VACCINATION—INOCULATION.

" Vaccination has been hitherto carried on through the agency of a single vaccinator, and by the Civil Surgeon and Native Doctor, &c., attached to th charitable dispensary, whenever subjects offered, but since the dismissal of the native vaccinator in September 1867, for submitting fabricated returns, this important duty has been at a stand-still, as none of the *ticcadar* class, to which this man belonged, (and by none but members of this class or caste will the people of the interior of the districts, as a general rule, submit to be vaccinated,) have applied for the vacancy, though notices have been sent into the district inviting candidates to do so. A native vaccinator was appointed by the Inspector General of Hospitals in the month of December 1867, but he was compelled to resign his situation in April 1868, as he could not obtain subjects, owing to the insuperable prejudices of the ignorant mass of the population in favor of small-pox inoculation.

Vaccination from its first introduction into this district has been practised to a very limited extent for the reasons assigned, as the statistical returns appended, embracing a period of thirty-two years, will show.

Annual Return of the number of persons vaccinated from the year 1837, to the year 1868 inclusive.

Years.	Period.	Total number vaccinated.	Successful.	Unsuccessful.	Doubtful.	Remarks.
1837	18 Months	134	30	104	0	Total number vaccinated, 24,361.
1838	12 Months	234	0	234	0	,, successful cases—12,341
1839	Ditto	371	161	210	0	Annual average No. vaccinated 761.
1840	Ditto	335	142	193	0	,, of successful cases—385.
1841	Ditto	381	150	231	0	Thus taking the population at 15,00,000 according to the census of 1801, the annual proportion of vaccinated to total population would be 0·050
1842	Ditto	463	168	295	0	
1843	Ditto	438	184	254	0	
1844	Ditto	439	107	332	0	
1845	Ditto	390	42	348	0	,, of successful cases 0·025
1846	Ditto	338	58	280	0	
1847	Ditto	354	79	275	0	
1848	Ditto	400	64	336	0	
1849	Ditto	368	70	298	0	
1850	Ditto	715	222	493	0	
1851	Ditto	855	265	590	0	
1852	Ditto	806	259	547	0	
1853	Ditto	890	295	595	0	
1854	11 Months	721	445	246	30	
1855	1 Month	34	13	13	8	
1856	9 Months	168	6	155	7	
1857	7 Months	229	189	35	5	
1858	11 Months	526	202	297	27	
1859	12 Months	482	275	148	59	
1860	Ditto	846	320	317	209	
1861	Ditto	756	318	227	211	
1862	Ditto	716	394	164	158	
1863	Ditto	1,458	887	280	291	
1864	Ditto	3,267	2,075	651	541	
1865	Ditto	2,371	1,607	427	337	
1866	Ditto	2,495	1,704	456	335	
1867	10 Months	2,286	1,534	452	300	
1868	6 Months	95	76	18	1	
	Total ...	24,361	12,341	9,501	2,519	

" The prejudices of the people as already observed have been to a very limited extent overcome, and only among the more intelligent classes of the community; but even among this comparatively small section, there are some who still retain their prejudices in favor of small-pox inoculation.

Inoculation is almost universally practised in this district, and with, in my opinion, very often the most disastrous results, in so far as it is the means by which the disease is originated, spread, and kept up, for though affording protection to large numbers, it endangers the lives of a great many.

No pilgrims should be allowed to pass from an infected district into one free from such infection, without a passport from the Police or local authorities."

NATIVE PRACTITIONERS.

"There are a very large number, I have been informed, of *kobirajes* and *hakeems* in this district, but I can form no idea as to the probable number. All, however, are equally ignorant and mischievous."

EPIZOOTICS.

" Reports of cattle disease were received from the Police in the months of January, February, March, April and May, which was called by the people *mata,* a term by which they designate almost all fatal diseases among cattle, attended with purging and swelling of the maxillary and salivary glands, and with fetid discharge from the mouth and nostrils of the animal. The vaccinator was sent into the district to report on the nature of the disease, and he pronounced it not to be small-pox, as it was unattended with any eruption; from the nature of the symptoms described, it must have been the disease called *puschima ;* the Police reports merely mentioned the existence of the disease, without details of any kind."

26—RAJMEHAL.

THE REPORT IS BY BABOO BANEY MADHUB BOSE, SUB-ASSISTANT SURGEON, IN MEDICAL CHARGE.

"Rajmehal—*Latitude* 25° 2′ *North. Longitude* 87° 43′ *East.*

Both the district and the town are very unhealthy.

In the year 1865, severe epidemic fever broke out. Considerable clearances were then effected."

The rate of mortality "for the past nine months" is reported as eleven *per mille*; but this is probably not reliable. The real rate is believed by the Sub-Assistant Surgeon to be much higher.

Baboo Baney Madhub Bose, reports as follows:—

"Almost all the cholera cases prove fatal, and about 20 per cent of the fever cases. Diarrhœa and dysentery, are not uncommon, but chiefly seen amongst the travellers, and generally terminate fatally.

No disease is peculiar to the locality. Elephantiasis almost rare. Leprosy seen occasionally amongst the hill tribes.

101 female and 127 male infants, aged two years and under, died from April to December. No rate of their mortality can be given, as there is no account of the number of children amongst the population.

No exceptional diseases occurred during the past year.

As a general rule the virulence of marsh malaria generates from the commencement of the rains till towards the end of September, when it reaches its maximum, and affects the people fearfully, and lasts until the month of January. Almost every individual is sure to be taken ill with fever or diarrhœa. Then again, in the months of April, May and June, cholera is sure to break out in the station, and in several parts of the district; there is not a small tract of land throughout the province that is said to be comparativety free from the above ailments, but on the hills they are rather less severe.

	Daily average number of sick.	Ratio per 1000 of	
		Sick to Strength.	Mortality to Strength.
Jail	3·63	31·8	0·107
Police	1·6	32·2	·05

All classes of people are affected equally, but the hill men enjoy a comparative immunity from most of the diseases above noted.

The people generally are unhealthy; almost all the children and many of the adults are affected with spleen; they are feeble and miserable, indolent and poor; many of the *Dhangurs*, *Paharees* and the natives who are able-bodied and muscular in appearance, lead a thievish life.

It is said that the place is deteriorating as regards the health of its inhabitants, every new year brings on increased rates of mortality and sickness; the oldest resident of the place is apt to say that he has not seen diseases so severe as in the present year.

About five years ago, the Assistant Commissioner found out the population of the district by receiving verbal information from chowkeedars; and calculating on the principle of five men to each house, it was 1,48,230. No separate account of men, women and children was taken.

By this time the population must have been changed a good deal, and even then, when the census was taken, it was merely guess work, and was not probably correct.

The subsoil water is found at an average depth of about 14 feet. The whole of the district is higher than the flood level of the Ganges. The Ganges formerly flowed by the side of the town of Rajmehal; but recently it has receded far to the east and left behind a *nullah* and a large *deyarah*, the old bed of the river.

Since the receding of the Ganges no siltings have occurred of late, but in certain places large islands or *deyarahs* are formed occasionally, which impede the current of the river. At a place off Begumgunge, where I was desired by the Assistant Commissioner to inspect and find out the probable cause of cholera which broke out there in the month of November last, I saw a long *chur*, formed during the late rainy season, and converting the portion of the river which flowed formerly by the village in a pretty rapid stream into a regular stagnant *nullah*, the water of which being rendered impure by the solution of a heap of rotten indigo plants, I supposed to be the chief cause of the malady.

The station of Rajmehal is very unfavorably situated in a sanitary point of view. It is surrounded by every sort of insanitation. A large extent of *jheels*, with numerous thick jungle-tracts and hills, lie to its west and south, and the swampy and marshy old bed of the Ganges commonly known by the name of *deyarah*, overgrown with long reeds and wild vegetation, and a *nullah* (the former site of the river) to its east and north. These are fertile sources of disease. The *nullah* on the north and east of the town is very shallow, it dries up in some places during winter and the commencement of the hot weather. Except in the months of July, August and September it remains stagnant throughout the year; but its course can be easily restored as reported last year, if a small canal joining it with the main stream of the river be opened. The greater part of the *jheels* might be converted into rice-fields, if the waters were drained down to the Ganges by canalization.

METEOROLOGY, &c.

No other meteorological observations are taken save those which are derived from a common thermometer and rain-guage.

The accompanying table will show the maximum, minimum, and range of thermometer during each month of the past two years:—

Mean average for	For the year 1867.				For the year 1868.			
	Maximum of	Minimum. Thermo	Range meter.	Rain-fall in Inches.	Maximum. of	Minimum. Thermo	Range. meter.	Rain-fall.
	°	°	°		°	°	°	
January ...	68·1	58·2	9·9	·1	67·	59·	8·	$\frac{2}{10}$
February ...	71·6	60·3	11·3	Nil.	70·4	62·7	7·7	$1\frac{6}{10}$
March ...	84·8	71·	13·8	$1\frac{1}{4}$	81·4	71·8	10·2	$\frac{1}{4}$
April ...	91·3	74·7	16·6	$3\frac{1}{2}$	87·9	78·5	9·4	1·
May ...	95·5	76·1	19·4	5	87·51	80·96	6·54	$4\frac{8}{10}$
June ...	93·3	72·1	21·2	$8\frac{1}{5}$	86·8	83·2	3·6	$8\frac{7}{10}$
July ...	88·2	82·1	6·1	$12\frac{1}{2}$	87·4	83·8	3·5	$8\frac{9}{10}$
August ...	85·6	83·7	1·9	$6\frac{1}{2}$	86·1	83·4	2·7	$20\frac{4}{10}$
September.	85·1	83·1	2·	$12\frac{8}{10}$	85·1	82·6	2·5	$7\frac{1}{10}$
October ...	83·	79·	4·	$1\frac{8}{10}$	82·03	77·38	4·64	$\frac{5}{10}$
November.	74·1	68·9	5·2	2	75·56	69·4	6·16	Nil.
December.	68·16	61·23	6·93	Nil.	67·77	60·69	7·09	Nil.
For the year.	82·39	72·37	9·86	$54\frac{1}{20}$	80·41	74·45	6·0	$53\frac{7}{10}$

The observations were taken by the Medical Officer of the station, the instruments being kept in his office room.

The only peculiarity observed during the past season, was the irregular distribution of rain during Autumn; large quantities of rain poured down within two or three days of a rainy month (August) whilst the greater part of it was without a single drop.

January, February and March are the most pleasant months of the year and moderately healthy. A gentle west wind at morning and evening is highly salubrious to the asthmatic, and the victims of chronic fever and spleen. In the months of April, May and June the days are very hot, the thermometer ranging from 75° to 95°; but the nights are cool; and this wide variation of temperature is sure to bring on cholera in several parts of the district. July, August and September are very disagreeable; the nights are excessively sultry; the atmosphere almost saturated with moisture. It is during this part of the year that malarious fever-poison is generated, which rages fearfully in the months of October, November and December."

IRRIGATION, CROPS, WELLS, &c.,

"Good and clean tanks are seldom met with in the district; but numerous holes filled with decayed and wild vegetation and other filthy matter.

The produce of the past year is below that of former years, but only with respect to winter crops, whose partial failure was owing to the irregular distribution of rain as before stated, and the complete want of it in the month of October.

SANITATION, CONSERVANCY, &c.

Nothing would give a clearer idea of the sanitary condition of Rajmehal, than to say briefly, that both the town and the district are full of insanitation.

Besides converting a few ditches into a tank, there has been nothing done towards improvements.

Supply of water for drinking and culinary purposes. Drinking water is obtained chiefly from the *nullah* on the north and east side of the town; that for culinary purposes is taken from stagnant ponds filled with the filthiest matters imaginable; but the people in the interior of the district use tank water for both these purposes. The drinking water, either from the *nullah* or from tanks is not at all wholesome. It has never been analysed; the people have very little idea of the benefit of using pure water; they care very little whether it be from a ditch, an unclean tank, or a puddle, and in fact there is not a single clean and deep tank containing good water throughout the district. In every village there are hundreds of holes, or very old ponds overgrown with reeds, weeds, and various other rank vegetations, whilst at the bottom are decayed leaves and rotten plants of every description. In these reservoirs of water, washing of clothes, personal ablution, and cattle bathing are indiscriminately performed without any objection.

The water of the *nullah* by the station can hardly be said to be pure; during the rains it is muddy, containing, in solution, decayed and rotten vegetation of the *deyarah*; and during winter and summer it becomes stagnant and acquires a peculiarly bad taste."

"Almost all the houses are overcrowded; every individual having about two hundred cubic feet, without light and ventilation.

Streets within the station are kept pretty clean, but they are without any drains, their utmost width is twelve or fourteen feet.

DRAINS, CESS-PITS, LATRINES, &c., &c.

No Drains, Cess-pits, Latrines, &c. &c.

Generally speaking there are no privies; the great mass of the people defecate on the nearest *maidan*, or beneath bamboo or other bushes that abound around their dwellings.

The rich families in the town use well-privies, which are situated in one of the back corners of their houses, and there is no consideration as regards their position in relation to sources of water supply.

The dry-earth and trench system of conservancy are used only in the jail.

About a mile distant from the station the Hindoos burn their dead, or they throw the bodies into the *nullah*. The Mahomedans bury them here and there indiscriminately, not very far from their houses.

As has been stated above, the atmosphere is highly tainted by the exhalation from filthly ponds and heaps of rotten indigo plants; and in the months of September and October it is shockingly felt; during the cooler parts of the day and the greater part of the nights, the lower strata of the atmosphere are highly saturated with a sort of depressing and noxious odour, which is dispersed by the heat of the day.

The clothing of the people is extremely dirty, and gives out a very unpleasant smell. They perform their ablutions in the same tank, stream, or *nullah* from which they take their water for drinking.

Arrack or country spirit, and fermented juice of palms, are the chief liquors in which they indulge; but the people are seldom seen suffering from any disease on account of their drunkenness."

SPECIFIC DISEASES.

"Cholera and fever are the diseases that prevailed endemically in certain localities during the year 1868. The former broke out about the middle of April at the neighbouring *Deyarah*, whence it made its way (as if wafted by the then prevailing eastern breeze) to the station, and bega attacking, first those who had newly come to it or passed by it as travellers. It raged fearfully till towards the latter part of May, when a heavy shower of rain lowered the temperature from 96° to 76° Fahrenheit, when it passed down to Oodhwa, a populous village six miles to the south of the town; and I fancied that the strong north wind, which then prevailed for two or three days, had much to do in carrying it to the south. At Oodhwa its virulence was not so severe as it was at Rajmehal, and there it ceased about the commencement of June.

The total number of deaths from this disease, from the month of April to December 1868, was 335.

Every individual, (both old and young) was taken ill with fever during the months of September, October, November, and December, and no portion of the district was exempted from it. The total number of deaths from fever amounted to 975 in nine months."

STATISTICAL RECORDS.

" The population of the district is not certainly known; the mortuary register is only for nine months. Supposing the population to be 1,48,000 and the deaths from cholera 335, the rate of mortality per 1,000 in nine months would be 2·5; that from fever 6·5; and from all other causes 2·0.

EPIDEMICS.

No history of epidemics can be given, as there is nothing on record; suffice it to say, that about the month of June 1865, an epidemic fever broke out here, which terminated about the middle of winter of that year."

SUGGESTIONS.

If any attempt is to be made to improve the sanitary condition of Rajmehal, the first thing would be to clear the numerous filthy ditches, and get rid of the heaps of rotten indigo plants, both of which combine to vitiate the atmosphere of the country; next, it would be necessary to restore the current of the *nullah* by joining it with the main stream of the Ganges; third, the vast extent of *jheels* should be drained by canalization; and lastly, the small jungles, underwood and bushes must be removed."

FAIRS.

There are no fairs of any importance.

VACCINATION.

The people of Rajmehal are willing to receive vaccination, but vaccinators are wanting. Wherever there is small-pox, the *munduls* of the villages inform the Assistant Commissioner, and ask for vaccination, or permission for inoculation in case the benefit of the former is not allowed to them."

NATIVE PRACTITIONERS.

"The number of *kobirajes*, *boids*, and *hakeems* is very few in this part of the country. They are all ignorant men without any knowledge of medicine; but the people believe in them more than in anything else. Many of them attempt to cure by incantations; while others follow a peculiar sort of starving system of treatment in many diseases, without the employment of any active remedial agents.

INDIGENOUS DRUGS.

All sorts of bitter tonics are used, but they are all inferior to quinine. There is only one medicine, however, which is extensively used, in cases of scabies, and with the best result. It is the oil of *Argemone* (*Sheal kanta* oil.) It is, I think, superior to any medicine employed for curing scabies."

EPIZOOTICS.

No cattle diseases have occurred of late."

27.—SONTHAL PERGUNNAHS, DEOGHUR.

THE REPORT IS FROM DR. R. C. CHUNDRA, CIVIL ASSISTANT SURGEON OF DEOGHUR.

"Deoghur:—*Latitude* 24° 29½′ *North. Longitude* 86° 45′ *East.*

The civil station is very healthy, but the native town, situated on low ground, is not so healthy.

Like all native towns, the sanitary condition of Deoghur, is very bad; besides being a place of pilgrimage, it is always kept in a chronic state of uncleanliness. The streets are narrow and dark, and the atmosphere charged with bad smells. Within the last eighteen months or two years, however, some improvements have been effected. A set of drains to carry off rain water have been constructed and the streets have been widened at places, and, by means of constant supervision, the inhabitants are influenced to keep the town clean."

SPECIFIC DISEASES.

Leprosy of both the anœsthetic and tubercular kind, and scrotal elephantiasis, with hydrocele are common.

There is a slightly extra amount of sickness during the months of August, September and October, owing to dampness and excessive generation of malaria. Diarrhœa and cholera sometimes occur in March and April, when the weather becomes suddenly hot, and when the town is left in a very insanitary condition, after the great *mela* in the month of February. The health of the jail and police has been very good during the year 1868.

Amongst the prisoners in the jail, the daily average sick has been	1·3
The ratio of sick to strength (in 1,000)	30·0
The ratio of mortality to strength	...
Amongst the Police the daily average sick has been...	2·2
The ratio of daily sick to strength (in 1,000) ...	70·0
The ratio of mortality to strength (in 1,000) ...	3·3

Generally speaking, the people of the district look healthy. As a rule, they are well built, able-bodied and fit for work; but they are poor. The healthiness of the place is decidedly improving."

STATISTICAL RECORDS.

"It is not known what the present population of the town or district is. No register of births or deaths is kept, although this could be easily done through the village (chowkeedars) Police. The population of the district is agricultural, but the inhabitants of the town of Deoghur are principally Pandahs, a class of Hindoo priests, who live on their earnings from the pilgrims who flock to the shrine of *Mohadeo* from all parts of India.

The country about here is principally hilly. The civil station is situated on a long and narrow ridge extending almost north and south. There is a very extensive slope in all directions, and consequently the natural drainage over the surrounding country is very good. The sub-soil water is generally found fourteen to eighteen feet from the surface."

METEOROLOGICAL OBSERVATIONS.

The registration of temperature and rain-fall has only recently been introduced here; other meteorological observations are not registered for want of the necessary instruments. The accompanying tables shew the rain-fall and mean temperature of each day during the years 1867 and 1868. The rain-gauge is kept in my compound, and the rain-fall is registered by me. The thermometer is kept in the dispensary near the town, which is situated in a much lower level, and the registration of heat is kept by the hospital dresser. On the whole there was a scanty rain-fall during last year.

Register of Temperature and Rain-fall at Deoghur for the year 1867.

	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
Date.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.
	°		°		°		°		°		°		°		°		°		°		°			
1	61·5	...	62·	...	74·	...	78·	...	87·5	...	94·	...	83·5	...	82·	1·0	84·5	...	86·5	...	64·5	0·3	64·5	...
2	62·	...	61·	...	71·5	...	80·	...	90·	...	95·5	...	85·5	0·2	83·	1·2	84·	...	85·	0·06	66·	...	62·5	...
3	62·5	...	61·	...	75·5	...	83·	...	93·	...	99·	...	84·	4·	84·5	...	83·	...	85·	2·2	74·	...	62·5	...
4	62·5	...	60·5	...	71·5	...	82·	...	94·	...	99·	...	82·	1·5	84·5	...	84·5	...	84·5	...	73·	...	62·5	...
5	61·5	...	60·	0·9	71·5	...	83·5	...	94·	...	98·	...	80·5	0·3	83·5	1·2	83·5	0·23	84·	...	73·	...	62·5	...
6	61·	0·2	60·	...	75·5	...	86·	...	94·5	...	97·5	2·	81·	4·3	84·	0·5	84·	...	84·	...	72·5	...	62·	...
7	60·5	0·1	61·	...	75·	...	87·	...	95·5	...	91·	...	82·	0·6	85·	...	84·	...	85·5	...	73·5	...	62·	...
8	61·	1·	59·5	...	75·5	...	88·5	...	94·5	...	91·5	...	82·	...	84·	...	84·5	...	84·5	...	75·	...	61·	...
9	61·	...	58·	...	74·5	...	87·	1·	95·5	...	95·	..	82·5	3·	85·	0·7	83·5	...	85·5	...	75·	...	62·	...
10	61·5	...	60·	...	75·	...	87·	...	93·	...	95·	...	82·	4·3	84·	1·8	84·	...	85·	...	75·	...	61·	...
11	61·5	...	60·5	...	76·5	...	75·5	...	94·	4·	96·	...	81·5	0·5	84·5	1·5	83·	...	84·5	...	75·	...	61·	...
12	61·5	...	63·	...	77·5	...	76·	...	73·5	2·	94·5	...	83·5	0·4	84·	2·	84·	0·45	85·5	...	75·	...	61·5	...
13	61·5	...	65·	...	78·	...	75·5	0·4	82·5	...	91·	...	83·	0·9	84·5	...	84·5	...	86·5	...	74.	...	62·	...
14	61·	0·2	64·	...	78·	...	78·5	...	81·	...	92·5	...	83·	...	84·	...	83·	...	86·5	...	72·5	...	61·5	...
15	62·	0·2	65·	...	78·	...	75·5	...	86·	...	90·	...	82·	...	82·	3·5	83·5	0·6	86·5	...	74·	...	60·5	...
16	61·5	...	64·5	...	78·5	...	76·	0·6	81·	3·1	91·5	...	83·	...	83·	0·8	84·5	...	87·5	...	73·5	...	62·	...
17	62·	...	63·5	...	80·	...	78·5	...	83·5	...	92·	...	82·5	...	83·	0·2	85·	1·1	86·5	...	73·5	...	60·	...
18	60·5	...	65·	...	79·5	..	78·5	...	85·5	...	95·	...	82·5	0·5	85·	...	84·5	0·4	86·5	...	72·5	...	60·	...
19	61·	...	69.	...	79·5	...	76·5	...	84·5	...	95·5	...	82·5	...	85·	...	85·5	1·1	88·	0·6	74·	...	60·	...
20	62·	...	70·	...	81·	...	77·5	...	89·	...	94·	0·8	83·	...	84·	0·1	85·5	...	87·	...	73·5	...	58·5	...
21	62·	...	69·	...	81·	...	75·5	...	88·5	...	95·	2·8	82·	1·6	82·	...	84·	...	87·	...	74·	...	58·5	...
22	61·5	...	67·5	...	82·	...	80·5	...	90·5	...	91·	1·9	83·	4·	83·5	...	84·5	0·53	87·5	0·4	65·	...	58·5	...
23	61·5	...	67·5	...	82·5	...	85·	...	92·5	...	89·5	...	84·	0·2	84·	...	85·5	1·3	88·5	1·35	65·	...	59·5	...
24	61.5	...	66·5	..	79·	0·1	82·5	...	93·5	...	90·5	...	85·	...	84·	...	85·5	...	87·5	...	65·	...	59·	...
25	61·	...	67·	...	79·	...	83·5	0·8	95·5	...	88·	2·7	84·	1·8	83·5	2·7	85·	...	86·	...	65·	...	60·	...
26	61·5	...	68·	...	77·	3·3	86·5	0·5	97·	...	91·	2·6	84·	2·	82·	1·	85·	...	87·5	...	64·5	...	60·	...
27	62·	...	72·	...	75·	0·2	86·	...	96·5	...	88·	0·7	83·5	0·4	81·	...	84·	...	86·5	...	64·5	...	59·5	...
28	62·	...	72·5	...	76·	...	89·5	...	98·5	...	86·5	0·9	84·	...	82·5	2·4	84·5	...	87·	...	63·5	...	59·5	...
29	62·	...	...	..	77·	...	90·	...	94·	..	86·	3·5	82·5	...	83·5	...	84·	0·3	86·	...	65·5	...	59·5	...
30	61·5	...	...	...	77·	...	92·	1·1	94·5	...	78·5	..	82·5	2·8	85	...	85·	...	86·	...	65·	...	59·5	...
31	62·	...	...	...	75·5	...	......	...	94·5	...	......	...	82·5	...	83·5	...	......	...	85·	0·3	......	...	57·	...
Total ...	...	1·7	...	0·9	...	3·6	......	4·4	......	9·1	......	17·9	......	33·3	......	20·6	......	6·01	......	4·91	......	0·3	......	...

Register of Temperature and Rain-fall at Deoghur for the year 1868.

Date.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.		JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.	Thermometer.	Rain-fall.
1	55·5	...	58·5	...	66·5	...	71·	...	85·	...	91·	...	90·	0·72	86·	0·4	85·5	...	88·	...	85·	...	73·5	...
2	55·	...	55·5	...	67·5	...	74·5	...	86·5	...	91·5	...	89·5	...	88·	...	89·	...	89·	...	85·	...	73·5	...
3	56·	...	58·5	0·52	65·5	...	76·	...	86·5	...	93·	...	90·5	...	89·	0·75	88·5	0·71	90·	...	84·5	...	73·	...
4	55·5	...	60·	...	68·5	...	76·5	0·25	86·5	...	91·5	...	92·	...	89	...	88·5	...	89·	...	80·	...	72·	...
5	54·	...	64·	...	68·5	...	77·	...	88·5	...	90·	...	87·5	...	89·5	...	88·5	...	89·5	...	77·5	...	70·5	...
6	55·5	...	65·5	...	66·	1·2	75·	...	87·5	...	87·5	...	87·	...	87·	...	89·	...	87·	...	76·	...	71·	...
7	56·	...	68·	0·3	65·	...	75·	...	87·	...	85·	0·35	92·5	0·11	85·	...	89·	1·0	85·5	...	74·5	...	71·	...
8	56·	...	64·5	...	66·5	...	76·5	...	85·	...	84·	1·6	92·	...	85·5	...	88·5	...	84·5	...	74·	...	70·5	...
9	57·	...	66·	...	67·5	...	77·5	...	88·5	...	85·	0·5	92·5	0·05	86·	...	89·5	...	85·5	...	73·	...	69·	...
10	53·5	...	66·5	...	67·5	...	78·	...	88·5	...	82·	0·06	92·	...	87·5	...	88·	...	86·	...	72·	...	68·5	...
11	54·5	...	62·	...	62·	0·4	80·	...	87·5	...	82·5	0·3	93·	...	88·5	...	89·	...	86·	...	73·	...	68·5	...
12	54·	...	63·5	...	63·	...	81·	...	89·5	0·9	82·5	0·2	91·5	...	87·5	6·6	89·	0·2	86·5	...	74·	...	69·5	...
13	54·	...	66·	...	63·5	...	82·5	...	83·	0·7	82·5	0·1	91·	...	85·5	1·9	87·5	0·92	87·5	...	73·5	...	68·	...
14	55·5	...	68·5	...	67·5	...	81·5	...	88·	...	84·5	0·55	92·	0·25	89·	...	88·5	...	86·	...	73·5	...	68·5	...
15	55·5	...	65·	...	65·5	...	81·	...	86·5	...	81·5	0·6	92·5	...	86·5	...	89·5	...	85·5	...	72·	...	67·5	...
16	57·	...	68·	...	68·	...	80·5	...	88·	1·6	81·	1·	91·5	0·75	85·	...	87·	...	86·	...	73·5	...	69·	...
17	56·5	...	65·5	...	66·5	0·1	79·5	0·6	88·	...	80·5	1·3	91·	0·01	85·	0·1	88·	...	86·	...	73·5	...	67.	...
18	55·5	...	62·5	...	65·5	0·1	80·5	...	88·	...	81·	...	91·	...	87·	...	89·	0·36	87·5	...	73·5	...	66·5	...
19	55·5	0·1	63·5	...	68·5	...	79·	...	89·	...	87·5	...	90·	0·3	87·5	...	90·	...	88·	...	74·5	...	67·5	...
20	55·5	...	65·	...	68·5	...	81·	...	89·5	0·6	88·5	...	90·	...	88·5	...	86·	0·1	87·	...	73·	...	66·5	...
21	57·	...	66·	...	69·	...	80·5	...	85·	...	91·	...	89·5	...	87·	...	87·5	0·85	86·5	...	73·	...	65·	...
22	57·	...	65·	...	70·5	...	81·	...	88·	...	92·5	...	89·5	0·15	87·5	...	88·5	1·	86·5	...	74·	...	61·5	...
23	56·5	...	65·5	0·2	72·	...	82·	...	88·5	...	91·	...	91·	0·92	88·5	...	89·5	...	86·	...	72·5	...	62·	...
24	57·	...	65·5	...	73·	...	83·	...	89.	...	91·	...	90·	...	89·	...	89·	...	87·	...	71·	...	62·	...
25	57·5	...	64·5	...	73·5	...	84·	...	90·5	...	91·5	...	91·	0·9	89·5	...	90·	...	85·5	...	71·5	...	62·5	...
26	57·	...	65-	...	74·5	...	82·	...	90·5	...	93·	...	90·	0·3	89·5	...	89·5	1·03	86·	...	72·	...	62·5	...
27	58·5	...	65·	...	75·	...	82·	...	84·5	...	92·5	...	89·	0·1	88·5	0·65	88·5	0·31	85·	...	72·5	...	62·	...
28	58·5	...	66·5	...	75·5	...	82·	...	84·5	...	92·5	...	87·5	...	88·5	...	88·5	1·36	85·	...	72·5	...	61·	...
29	58·	..	66·	...	75·5	...	84·	...	84·5	...	92·	...	89·	...	88·5	0·1	88·	1·3	85·	...	71·5	...	60·5	...
30	57·	0·1	...	...	74·5	...	83·5	...	90·5	...	92·5	...	88·5	0·02	89.	...	87·5	0·94	85·	...	72·5	...	61·5	...
31	58·	...	...	...	75·5	...	......	...	91·	...	......	0·05	87·5	...	90·	...	. .	...	86·	...	......	...	61·	...
TOTAL...	...	0·2	...	1·02	...	1·8	......	0·85	......	3·8	......	6·61	......	4·53	......	10·5	......	10·28	......	...	......	...	......	...

"The proportion of irrigated to unirrigated land is about 1 to 3, and of cultivated to uncultivated land is 1 to 20.

The country is hilly and undulating. At a short distance below the top of the slope, large earthen *bunds* or embankments are thrown up the cultivated paddy land being situated below these *bunds*. The rain water from the surrounding high land is collected above the *bund*, by which means a large reservoir of water is formed, which is reserved for use in the dry weather. A hole is made in the *bund* at some low spot, through which the water from the reservoir flows, and irrigates all the paddy-land below.

Near villages and towns there are mango topes and large *mowah* trees, but the trees in the jungle are principally *sál* and ebony.

The civil station of Deoghur being a small place, and being situated on a ridge, its sanitary condition is very good. But the sanitary condition of the native town of Deoghur, situated about a mile to the east of the civil station is particularly bad. The houses which are built principally of mud, are closely packed together, badly lighted, and very badly ventilated. The streets are very narrow, and they are generally kept in a dirty condition. The privies of private houses being situated on the sides of these narrow lanes, help, to a great extent, to vitiate the already stinking atmosphere.

No properly organised conservancy exsits, and there is no individual or corporate body, who may be said to be responsible for the sanitation and conservancy of the place. The Medical Officer keeps an eye on the state of the town, and on his recommendation the Assistant Commisioner, who is the district Magistrate, has it cleaned at times.

Deoghur is a place of great resort by pilgrims from all parts of the country. In addition to its sanitary condition being originally bad, it becomes a hundred-fold worse at the periodic *méla* times. To remedy this state of things, half measures will not answer, extensive and radical improvements are necessary, and no measure will be attended with success unless the Municipal Act be extended here in its entirety.

This part of the country is not so malarious as places in Lower Bengal, still malaria does exist especially in the vicinity of the town. This is owing to the existence of broken ground, stagnant and dirty ponds and hollows, and low jungle in the immediate vicinity of and almost all round the town.

The inhabitants obtain water for drinking and culinary purposes from the ponds in the vicinity of the town. The general opinion is that the water is bad, but it has never been properly analysed by any one. The ponds are not very deep, and they are almost choked with living and decomposing vegetation. In addition to this, the inhabitants themselves help to render the state of things worse than it otherwise would be; by throwing dirt and rubbish near the water's edge in several places, and by polluting the neighbourhood in other noxious ways. The source of water in these ponds or *bunds* is not from springs, but the collection of surface drainage from the surrounding country during the rains. Human beings and cattle bathe in these ponds, but no attempts are made to clean them periodically.

As mentioned above, the streets are narrow and generally dirty. In some places they are barely four feet wide.

No proper system of drainage exists. Lately some narrow and shallow open drains have been made on each side of the streets for the purpose of carrying off rain water. But, as the inhabitants allow the filth from their houses and privies to flow into them, they are generally found dirty, especially as there are no arrangements to keep them always clean. In short the drainage of the town is very defective.

The *excreta* of both sick and healthy are disposed of without any care.

Wherever an open unoccupied piece of ground is found, it is made use of by the inhabitants for the reception of all sorts of filth from the neighbourhood; several such places exist in the very heart of the town, but no one takes any trouble to clean them, or to utilize the filth in any way."

CREMATION, INTERMENT, &c.

"As a rule, the dead bodies are burnt. This is generally done on the bank of one of the sacred tanks, and often in a very careless way."

FAIRS.

"Three *mélas* are held at Deoghur during the year. The first one is on the full moon time in the month of *Bhadro* that is, the full moon between the 15th August and 15th September. It lasts for three days, and the average number of outsiders collected, amount to about 15,000. The second *méla* takes place at the time of the *Sripunchomee* in *Mágh*, (January). It lasts for a week, and the number of people collected varies from 5, to 7,000, and on rare occasions to 30,000. The third is the greater *méla* of the *Shib-Ratree* in *Falgoon* (February) at the time of the new moon. The average collection on this occasion is said to be about 100,000, and in previous years it has been known to be twice or three times this number. Of late years there has been a falling off."

"At the time of the full moon in *Kartick* (November), the ***Râsh méla*** takes place at Sirsa, about thirty miles from Deoghur. It lasts for a week, and the people collected amount to about 12,000, most of whom are ***Sonthals.***

About sixteen miles to the south of Deoghur is a small village called Lalgurh, on the chord line of Railway. Here a *méla* takes place at the time of the full moon in *Aughrun* (December), the gathering varies from 3, to 4,000, composed partly of Sonthals. This festival lasts for three or four days.

At Boorhai, about fifteen miles to the south-west, a large assemblage of 15,000 or 16,000 people takes place on the day when the Hindoos first eat the new rice. This occurs sometime in the beginning of December, and lasts for four or five days.

To the extreme south of the district of Deoghur, on the bank of the Burakur River, a *méla* is held on the *Sunkrant* or last day of *Mâgh* (sometime in January.) This *méla* lasts for one week, and the crowd amounts to about 6,000."

VACCINATION, &c.

. The Sonthal Pergunnahs, of which the district of Deoghur forms a part, have, from 1867, been formed into a vaccination circle. The staff consists of a Deputy Superintendent and six vaccinators. They did very little work in this district during the last season, as they were employed in a distant part of the Pergunnahs. During the present vaccination season the work was, however, commenced here, and most of the villages round about Deoghur have been vaccinated. From October to December 1868, the total number vaccinated amounted to 1,426, of which 1,120 were successful, and the rest, *viz.*, 306, were unsuccessful and doubtful cases. In addition to the above, about eighty children were vaccinated in the month of April amongst the railway coolies, by native inoculators whom I engaged for the purpose.

Being one of the strong-holds of Hindoo idolatry, the prejudices of thepeople, at Deoghur and in the district, against vaccination have been very strong. So much so that the Deputy Superintendent, with his whole staff of vaccinators, could not succeed in the least in 1867 in vaccinating in this district, and had consequently to move away to another part of the Sonthal Pergunnahs. These prejudices are, however, being gradually overcome, as will be evident from the above return of vaccination during the present season.

Inoculation is practised here on a very limited scale at present. This is owing to the Vaccination Act having been extended in 1866 to some of the principal towns of this district. The native inoculators were thus, for the time, thrown out of employ, but lately some of them, partly for the sake of their own interests, and partly perhaps fron being convinced of the harmlessness of vaccination, have been applying to me to be permitted to vaccinate the people with lymph supplied by me, and under my supervision. This is a peculiarly significant omen, as it appears to be the first glimpse of what Government have been striving ultimately to bring about, namely to raise a body of private practitioners who, instead of inoculation, would take to practising vaccination on their own responsibility, and without any cost to the State. On this subject I have a scheme of my own to submit to Government for consideration, which will be done in due order."

28—MAUNBHOOM, PURULIA.

THE REPORT IS BY DR. WILLIAM WILSON, CIVIL MEDICAL OFFICER OF PURULIA.

"Púrúlia (Poorooliya)—*Latitude* 23° 26′ 30 *North. Longitude* 86° 22′ 30 *East.*

Purulia is situated in, and is the chief town of the district of Maunbhoom, the latter lying between 22° 6′ and 24° 3′ North Latitude, and 85° 48′ and 87° 17′ East Longitude. Maunbhoom is a Non-Regulation District, belonging to the Chota-Nagpore Division.

The small but rising town of Purulia is considered to be healthier than most stations in Lower Bengal.

Purulia, dating its existence thirty years ago, has very little history of sanitation to speak of. If there has been any change in its sanitary condition, that change has been decidedly for the worse. The following are some of the causes at work for its deterioration. The town is growing in extent year by year; small, ill-ventilated and altogether inferior huts are being erected, in which *baories* and people of the most filthy castes (which prevail in Purulia) are huddled together. Lands in the very heart of the town have been subjected to the plough, and one finds *kutcheries*, huts, and *paddy* plants side by side. It is needless to say that, if matters are not rectified, Purulia, ten years hence, will rival in filthiness the towns of Rugonathpore, Jhulda, Barrabagan, Manbagan, and Khuttra, situated in other parts of the district."

SPECIFIC DISEASES.

"*Fevers*—none of a fatal, or even dangerous type; bowel affections, bronchitis, pneumonia and pleuritis are common, though the mortality is, I am happy to state, not large.

Cholera, and Small-pox—are almost always hovering about the district, cropping up now and again at different places. Leprosy and elephantiasis are common diseases unfortunately, and so are cancers and dropsies. Fevers (intermittent), rheumatism, venereal and itch are frequent diseases too.

Cholera, and Small-pox have made their appearance at different times throughout the year in various parts of the district. The first named disease occurred here early in June last, and I consider that the early and unusual rains, together with the (then) insanitary condition of Purulia had much to do with the epidemic.

STATISTICS.

The population of Purulia itself may be estimated at 5,000.

Population of the district.

Men	3,58,888
Women	3,35,596
Total	6,94,484, including children.

The figures (population) were obtained by the non-professional Survey party between 1861 and 1866.

There is no registration of births and deaths.

Statistics of Jail for 1867 :—

Aggregate prison population for the year	82,332
Admissions into hospital, ...	271
Deaths	9
Ratio per cent of deaths to strength	3·02
to daily strength	4
Percentage of deaths to total prison population ..	0·71
Total prison population	1,260

Returns for 1868, not yet prepared.

The people of Maunbhoom do not generally look healthy. They are poor and indolent to a proverb. Those who reside in the northern part are somewhat better in appearance than those who live in the south."

"The agricultural population is not a thriving one.

There is a great deal of emigration going on in this district, though not so much within the last six months; people leave for Assam, Cachar and Sylhet, to the tea plantations. There are licensed recruiters, who go about regularly from village to village recruiting poor people and those who are tired of home life.

Incidence of population to the square mile—125·1.

Water is found seventeen to eighteen feet below the surface.

Purulia is higher than the flood-level of the nearest river—Kassi. There is little silting in it, and its course is not liable to alteration year by year. The site of Purulia is excellent physically, and if the inhabitants suffer from disease, they owe their sufferings to their own ignorance.

The surrounding country, with reference to Purulia, is never under water for any length of time.

Purulia occupies a central position in the undulating plains of Maunbhoom. Its site is high, and the view of the south extending from fifteen to twenty miles is picturesque. There are no marshes or swamps near it. The river Kassi already mentioned is at a distance of two miles to the south. The Rukat jungle, lying eastward, is at a distance of six miles from the station. There is very little rank vegetation. The country around was at one time completely denuded of trees, and consequently the temperature of the station even now continues to be higher than some parts of the interior. Trees have been recently planted at the instance of Government officers, and in a few years hence, we may expect to see parts well wooded. There are a number of tanks in Purulia, also an artificial lake. The Baghmondee range of hills is some ten miles to the south-west. There are no shallow streams, stagnant *nullahs*, or swamps in the vicinity of Purulia."

METEOROLOGY, CLIMATE, &c.

"Only thermometrical observations have been made in the absence of other Meteorological Instruments. Until the undersigned joined (in October 1866) the range of the thermometer used to be recorded (in a very irregular manner) by the jail native doctor. Since the arrival of the present Medical Officer, regular observations have been made, and a rain-guage indented for."

Temperature.

In-door.

For 1867.			For 1868.		
Maximum.	Minimum.	Medium.	Maximum.	Minimum.	Medium
96°	57°	76½°	97½°	55°	76¼°

Outdoor.

Maximum.	Minimum.	Medium.	Maximum.	Minimum.	Medium
116°	78°	97°	118°	76°	97°

Rain-fall.

Inches.	Inches.
49·5	43·2

Prevailing Winds.—West and North-West.

General observations.

A great deal of rain fell this year, for which reason the crops were exceptionally good.

The hot season begins about the middle of March, and lasts (hot winds blowing) until the end of June, when the rains set in. From 1st November to the latter end of February the weather is cold and bracing.

Less rain-fell this year than in the previous one. Owing to there being no record of the rain-fall, it is impossible to make anything like an exact comparison. Unusually early and heavy rain fell in June last—17½ inches.

The past two years have not differed in any material respect from preceding years, so far as I have been able to gather from the evidence of the oldest European residents, and also from the hospital records.

Of the district generally, the climate is good, but some parts of Maunbhoom are exceedingly unhealthy. The hot season is dry; the setting in of the rains is followed by epidemic cholera, though not invariably; attacks of ophthalmia occur during the latter end of the rains. The cold season is delightful."

IRRIGATION, CROPS, WELLS, &c.

"In Maunbhoom, there are 272,518 square miles of cultivation to 282,814 square miles of waste.

The crops of the present year, though not so good as those of 1867, are as good as those on an average; the slight deficiency (about one-fifth) was owing to scantiness of rain in October last.

The subsoil water variably averages from five to twenty feet from the surface. I can only speak of the wells in the station.

SANITATION, CONSERVANCY, &c.

The sanitary, or rather insanitary condition of Purulia, has been more than once brought to the notice of the civil authorities both before and during the prevalence of cholera, which visited the place early in June last. Additional carts and sweepers were on urgent solicitation entertained, but reduction of the conservancy establishment has taken place recently, by one-half, whether owing to lack of municipal funds or some other cause, I am not aware; most certainly the alteration has not bettered the sanitary condition of the bazar.

The Deputy Commissioner is in charge of the district.

Up to the time of the occurrence of the outbreak of cholera in June last, as above recorded, the principal roads and streets were left tolerably clean as they are now; but the less frequented bye-ways and other places were centres of filth. Much has been done in the way of removing accumulations of rubbish, and keeping the places in tolerable order, but an increased conservancy establishment is absolutely necessary for the cleanliness and consequent healthiness of the bazar.

If six carts, with their attendants, and double the number of sweepers be employed, such an establishment will be adequate to meet the requirements of the place; but a thorough supervision must be exercised otherwise the work will not be half done. I have frequently observed carts, only partially filled with refuse matter, passing down the bazar, whereas they ought to have been properly laden. Again the sweepers do not work as they ought to do, as I have noticed, simply because they are not made to do so.

"There are still some places in and around Purulia which I would like to see filled in but I believe the chief difficulty in the way of the correction of the defects I have pointed out is the want of money.

Owners of dwellings, in whose vicinity stagnant ponds, brushwood, &c., exist, urge poverty as their reason for being unable to remove the unhealthy and unsightly objects referred to. In the case of people who could afford to pay for the correction and removal of such abuses, the Deputy Commissioner very properly insisted, on penalty of the infliction of a fine, on their doing so; yet, in the case of poor people (of whom there are many in Purulia) this cannot be done. If then a certain sum of money be sanctioned, in the first instance, for the thorough cleaning of the bazar, and a suitable establishment (conservancy) be maintained, I do not think it will be a very difficult matter to keep the place up to the mark, in point of cleanliness; provided, as before remarked, the said conservancy establishment be sharply looked after. The native (a *mohurrir* I believe) in charge of the carts and sweepers ought to be held responsible, and then he will be sure to look sharply after those placed under his charge.

The locality of Purulia itself is by no means malarious, when due attention is paid to the sanitation of it. Though a stranger to the Lower Provinces, I am happy to state that Purulia is quite as good, in point of salubrity, as most districts in India. It must be added, however, that it is susceptible of improvement, and I hope it will be improved shortly.

In some parts of Maunbhoom, forest-trees have been very indiscriminately and imprudently cut down.

Such proceedings have assuredly somewhat affected the salubrity of the district.

The character of the drinking-water is generally bad.

Tanks are almost invariably shallow, the water in them is from five to fifteen feet deep, they mostly contain rank vegetation, and are never kept clean.

The ground in the immediate vicinity of tanks consists of rice-fields; tanks, are subject to contamination from both animal and vegetable impurities, and the contamination is both direct and by percolation.

The source of water-supply is never cleaned out systematically.

No means are adopted for preserving the purity of the water; decayed leaves are found on its surface, and rank vegetation at the bottom.

In the case of tanks, persons are allowed to bathe where water is drawn for drinking and cooking purposes.

Washing of clothes is allowed at the same place.

Cattle are allowed to bathe and wallow in the water.

In the mud of certain filthy tanks, pigs are allowed to burrow.

Jute is steeped in tanks.

Sorry to state that they are, occasionally.

When good sites are procurable, and when the builder has capital, good judgment has generally been shown both in the site and ground elevation of individual houses. Stress is laid on this, because it is found that although each dwelling is in itself built with very fair judgment, yet, as the natives of this country look only to what they consider their own convenience, and are ignorant of, or disregard the common laws of sanitation (by which each builder should leave a passage for his drainage, so as to cause no inconvenience to others) each successive house forms a barrier to its neighbour's drainage, and the village, in process of time, becomes a mass of filth and corruption.

The construction of the dwellings is as good as can be expected from people who cannot, or will not, spend money on them, but it must be added that the system of a couple of generations living in the same compound is a great drawback.

The streets of a village vary in width, from eight to twenty feet; in large and pergunnah villages, there is some approach to regularity, there being generally a main street of about twenty feet, and one or more side streets, ten to fifteen feet wide. These may be considered the main village thoroughfares; branching from these and winding round the piled-up dwellings, forbidding looking lanes show themselves, during the rainy season knee-deep in liquid manure and filth, and during the hot weather overpowering from effluvia given out.

It may be taken as an established custom, that close to every house there is a dunghill; the exceptions being villages in which the municipal funds admit of carts being employed for the removal of rubbish.

DRAINS, CESS-PITS, LATRINES, &c.

"Purulia stands on high ground, the surrounding portions being mostly of an undulating character. I have not observed, in the vicinity of the station and bazar any accumulations of water, (except where there happened to be excavations,) even after heavy falls of rain.

"The natives are by no means particular as to the locality wherein they obey the calls of nature; the nearer a tank or pool of water the better, they think.

All should be compelled to resort to public latrines, and then we would not be disgusted at seeing human fœcal matter in every direction.

There does not appear to be any place specially appointed for the burning of the dead; although such ceremonies are never performed in the neighbourhood of houses.

There is not much done by butchers in the way of killing animals, as the European residents have reason to know.

* (2.*g*.) As close as they can be, unfortunately.

(3.*g*). The bones are thrown into shallow excavations or pits, close to the dwellings. I have recommended that such be burnt or buried at a considerable distance from houses.

(1.*h*). Some of the dirty, stinking ponds, especially one near the new Thannah, under the very noses of the Police who live there. Cultivation is carried on too close to dwelling-houses, and to too great an extent. There are some hedges also and bushes, which would be all the better if cut thin and short.

People used to dig the earth and make bricks on the road side, burning them at a little distance. All that has been very properly stopped.

Some inveterate cases of itch are to be found, and I have had the greatest difficulty in curing some of them. As for a few of them, they are looked upon as incurable.

The poor people, or others who do not consider themselves respectable, bathe anywhere most convenient to themselves, without any regard to the impurity of the water in which they bathe."

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* These figures and letters refer to corresponding parts of the Sanitary Questions.

GENERAL MODE OF LIFE.

" The drinking of vile stuff prepared from *mowah,* and the smokng of a combination of opium and the pounded leaves of the *guava* tree, are very prevalent and bad habits amongst most of the people, especially the lower orders. They are much given to venery too; I cannot say that either their habits or their morals are to be commended.

(*m.*1.) Intemperance is very common I regret to state, owing to the cheapness (from two to four pice a bottle !) at which liquor is sold, and the facilities for obtaining it

(*m.*3.) The chief liquor called *dharoo* is prepared from *mowah,* (*Bssia Latifolia, Roxb. Mhowa, H. and B.,*) the flowers of which are distilled in ten times the quantity of water.

Specific Diseases.

		Treated in 1867.	In 1868.	Died in 1867.	In 1868.
1	Fever ... Intermittent ...	487	408	......	......
	Remittent ...	2	8	1	1
	Continued ...	......	......	......	......
2	Cholera	8	80	......	40
3	Diarrhœa	46	41	6	......
4	Dysentery	48	40	5	4
5	Small-pox	17	......	2	......
6	Hepatitis	7	25	......	......
	Other diseases	1,722	2,080	18	7
	Total ...	2,237	2,682	32	52

The foregoing figures, I have taken from the dispensary returns."

EPIDEMICS.

" *Cholera.*—The first case occurred on the night of the 9th June, in the person of a Police Constable, who was brought here in a moribund state from a Thannah not far from Bunabun the nearest Railway station to Purulia, about forty-four miles away."

2. Ninth June.

3. Unusual and heavy rain set in on the 7th June, and continued, with scarcely any intermission until the 18th, when the rain-fall register showed that 17·3 inches had fallen.

4. In particular parts of the bazaar; the civil station, jail, and Police lines being happily exempt.

5. Almost in a direct line from north-east to north-west.

6. In a place called *Moonsiff Dangah,* which was a receptacle of filth, but is not so any longer, I am happy to add.

7. Indiscriminately.

10. I saw and treated eighty persons, of whom forty died.

12. I attribute the late visitation, first to the very severe rains (on 7th June, there fell six inches and four-tenths of an inch of rain in sixteen hours) which set in unusually early, and also to the abominably filthy condition of the bazaar generally, but of *Moonsiff Dangah* especially.

15. I caused cholera medicines to be distributed in the four quarters of the bazaar, and had notice given to the inhabitants, that any persons who were feeling indisposed with choleraic diarrhœa, or griping pains in the abdomen, should apply to the intelligent and well-known people, to whom I had supplied medicines for distribution, I am happy to be able to state, that several persons did apply at those places, and also at the charitable dispensary, and obtained relief.

Finding that most of the sufferers would not resort to the "Cholera Hospital," I thought the next best thing I could do for them would be to visit them in their houses, and I did so, accompanied by the native doctor, and compounder (carrying with us some medicines) regularly every day, until the disease finally disappeared on the 8th July.

I wish to add, that the conservancy establishment was temporarily increased at my urgent solicitation, for the purpose of removing and burning accumulations of filth. Also, that many excavations were filled in with dry-earth beaten down, foul water being baled out, and removed to a distance. Undoubtedly Purulia was all the better (and is now) for this cleansing; but still it is not in such a state of cleanliness as one would wish to see."

FAIRS.

"Fairs are held in the district at:

Motgada	... Shyamsoonderpore	... End of February
Telkoopee	... Cheliama ...	... March.
Boodhpore	... Maunbhoom...	... April.
Dhodanga	.. Bunabhoom ...	... May.
Chokultore	.. Kassipore ...	... September.

From five to ten thousand people gather together at these fairs. The fairs are not considered a source of disease."

VACCINATION, INOCULATION.

1. "There is no vaccination going on in the district this year. In November 1866, soon after my arrival here, the former Deputy Commissioner (Captain R. C. Money) and I, made arrangements with the *Thebaits*, or Inoculators, that they should practice vaccination instead of inoculation and they promised to do so; I thereupon indented on the government stores, Calcutta, for an adequate supply of lancets, and obtained, from the Superintendent of Vaccination for Bengal, a proper supply of lymph and crusts. The *Thebaits* soon after commenced their operations, but at my visits of inspection, I discovered that the men had done their work in part only, *i. e.*, they vaccinated children of low caste, whilst they inoculated those of high caste. I represented the matter in the proper quarter, the Deputy Commissioner had no power to punish the *Thebaits*, and this they knew. In December 1867, a circular was issued by the authority of the Government of Bengal, from the Office of the Inspector General of Hospitals, Lower Provinces, authorizing the entertainment of six of the best *Thebaits* as Vaccinators for the district. To this arrangement, Captain Money objected, on the ground that the occupation of *Thebaits* was hereditary, and that to appoint six of their number only, would be calculated to do harm to the remainder (about a hundred I believe.) A great deal of correspondence ensued on the subject, and it was finally settled, that six *Thebaits* were to be employed, in compliance with the Circular adverted to above. By the time sanction came, the hot season was advanced so far, that the Superintendent of Vaccination of this (the Chota-Nagpore) Circle deemed it unadvisable to employ the men. Within the last few months, I urged strongly on the Superintendent of Vaccination, the necessity of resuming vaccine operations; but he replied, that he had been instructed to confine his operations to one district at a time, as the area of the division would be too much for him to superintend, and that he would commence with the Hazareebaugh District first. I pointed out to Dr. Hoskins, that to confine his operations to one

district at a time, would be leaving the other three districts of his division unprotected for one, two, and three years, as district Medical Officers had the superintendence of vaccination taken out of their hands by his being appointed Superintendent. I received the same reply as before. All I have been able to do in the matter of vaccination in the civil station, is in the baazar and Police lines, and there with great difficulty. The people are averse to being vaccinated, and the *Thebaits* support them for obvious reasons. Until vaccination is made law, and inoculation interdicted, little of the former and much of the latter will be practised.

2 From my Inspection Reports of 1867, I gather the following, which I reported to the Deputy Inspector General of Hospitals of the Circle, and to the (then) Deputy Commissioner, in 1867—

Total number vaccinated	...	... 542
„ „ inoculated	...	... 302
	Grand Total	... 844

On the 12th ultimo, with the assistance of the Deputy Commissioner, A. L. Clay, Esq., and the Moonsiff, Baboo Nobin Chunder Paul, I vaccinated some high caste children of Purulia. Several *Thebaits* were present—having been invited by the parents of the children—who merely presented some offerings at the shrine of the goddess of small-pox (in the shape of rice, oil, ghee, cloth, flowers, &c.,) which they afterwards appropriated to themselves, (except the flowers) whilst the native doctor and I performed the operation. To oblige the Deputy Commissioner, the people of Purulia consented to have their children vaccinated; not because vaccination is at all popular with them. Here is an instance of their blind superstition—the parents refused to give me the scabs that fall off the arms of their children, alleging as a reason, that they, the juveniles, would die soon afterwards! In conclusion, I would recommend that inoculation be put down, once and for ever, by law, and vaccination be made lawful."

NATIVE PRACTITIONERS.

"I believe there are eight or nine *boids* or *kobirajes* in Purulia itself, I have not been able to ascertain how many there are in the district; a good sprinkling I have no doubt. I am satisfied from what I have heard of these individuals that they are ignorant mischievous men. One of their practices is to draw away patients from our dispensary, on the pretence of treating them in a superior style, and ridding them of their diseases, but in reality to fleece the poor fellows, some of whom find their way back to the dispensary with their ailments increased.

The only medicine (a sort of *panacea,* I believe) that I have heard of, is a preparation of poisons, (arsenic forming the chief ingredient) called *bisburree,* or *snake* poison. This is prescribed for every disorder, which it is said to cure."

EPIZOOTICS.

" I have not been able to gather any reliable information on this head.

Whenever I hear of the death of several heads of cattle, I have a strong suspicion that the animals may have been poisoned, either out of grudge to the owners, or for the purpose of obtaining their hides. I know of two cases brought to notice by the Police, where a white powder, chiefly composed of arsenic, was attempted to be given to cows."

29.—CHYEBASSA.

THE REPORT IS BY DR. S. T. MANOOK, CIVIL SURGEON.

" Chyebassa.—*Latitude* 22° 32′ 53 *North. Longitude* 85° 50′ 53 *East.*

Height above the sea, 700 feet.

District Singbhoom, Chota-Nagpore Division.

Healthy generally, particularly free from chest diseases, but intermittent and remittent fevers with enlargement of spleen rather common.

I should say there has been very little change (in a sanitary point of view) in the present and past condition of Chyebassa; I am speaking from the experience of the last four years.

Intermittent and remittent fevers are the prevailing diseases; they are usually followed by enlarged spleen; they are of the common type, but the prostration of the system is extreme. It is also found very difficult to get rid of an attack without change of air. Quinine has no good effect on it, perhaps sometimes the reverse, and nitrate of potash with nitric æther is found to be the best remedy.

Ophthalmia may also be said to be a prevailing disease, especially in the months of July and August. I have not been able to trace the real cause of this prevalence, but I do not think it is specific."

"Cases of leprosy are seen, but they are not common. Those presenting themselves with this disease are usually people of other districts.

1867 and 1868 have been healthy years. At the end of 1866 small-pox broke out in some parts of the district and continued till about the end of January 1867.

The health of the inhabitants of the place has been the same I should say; neither improved nor deteriorated. But they are hard drinkers, and this may in time have a perceptible effect in deteriorating their health, although this is not apparent yet."

Population of the whole district.

Men.	Women.	CHILDREN.		Total.
		Male.	Female.	
......	......	......	......	324,183

Of the Coleban (part of the district.)

Men.	Women.	CHILDREN.	Total.
		Male and Female.	
30,802	31,169	29,980	91,951

Of Chyebassa.

Men.	Women.	CHILDREN.		Total.
		Male.	Female.	
792	785	406	324	2,307

" The census for the whole district was taken some time in 1854, and cannot therefore be depended on, as there must be an increase after fourteen years.

In the Coleban, which extends fifty miles north to south, and thirty miles east to west, it was taken in 1866, during the last settlement, by house to house visitation, and it may be depended on.

The population of the civil station was taken in 1867.

Registration of births and deaths has been in force since November 1867. It is carried out by different agencies, in different parts or pergunnahs of the district. Thus, in the Coleban by the pergunnah accountants—*teshildars*—who are informed by the *mundul* or head of the village or his *dakooa*. In Dholbhoom the register is kept by the pound mohurrirs, who are informed by the chowkeedars of the villages. In Seraikela, Khursowah and Kera, it is carried out under the *Cazee* and *Thakoors* of each place. In Chyebassa (civil station) by the pound mohurrir, who is informed by the chowkeedar. After registration in the villages, the returns are sent to the civil station where they are all entered in one register.

I consider the returns rendered from the civil station, the Coleban, and Dholbhoom reliable, as they are obtained through the agency of what may be called Government servants; but they are not rendered so regularly as could be wished, and in the Coleban, in one season of the year, when the *munduls* and *dakooas* are more after their fields and crops, there is every likelihood of their neglecting to give the necessary information to the pergunnah accountants. By referring to the register, I find that the returns from some parts of the Coleban are still in arrears.

As for the returns rendered by the *Cazee* and *Thakoors* I cannot speak so reliably, as I have sometimes found the returns sent in blank; for instance, the return of deaths for June from Pergunnah Seraikela was blank.

The system is the best I think for the district, but a little more care and responsibility are needed on the part of agents to render it reliable.

The population is certainly thriving.

Incidence of population to the square mile, for the whole district (being 4,503 square miles,) 71·99 for the population ascertained in 1854. For the Coleban, 1,500 square miles, 78·854, for the population, ascertained in 1866."

Records of Thermometer and Rain-gauge in Chyebassa.

YEARS.	JANUARY.			FEBRUARY.			MARCH.			APRIL.			MAY.			JUNE.		
	Thermometer.	Rain-fall.	Wind.	Thermometer.	Rain-fall.	Wind.	Termometer.	Rain-fall.	Wind.	Thermometer	Rain-fall.	Wind.	Thermometer.	Rain-fall.	Wind.	Thermometer.	Rain-fall.	Wind.
	°	Inches.		°	Inches.		°	Inches.		°	Inches.		°	Inches.		°	Inches.	
1858	......	......	......	71·875	......	E.	81·25	......	S-E.	88·25	......	S.	88·875	......	S.	89·625	......	S-W.
1859	63·125	......	W.	71·75	......	S-W.	76·25	......	N.	83·25	......	W.	90·75	......	W.	87·5	......	W.
1860	68·25	......	N-W.	74·25	......	N.	81	......	W.	87·5	......	S-W.	93·5	......	S.	89·75	......	S·
1861	66·75	......	S-W.	70·25	......	S-W.	78·5	......	S-W.	88·25	......	S-W. by W.	89	......	S.	83·75	......	S.
1862	62·5	......	N.	68·5	......	S-W.	75·75	......	S-W.	82·75	......	S-W.	85·5	......	S-W.	85	......	S-W.
1863	62·5	......	N.	65·	......	N.	77·5	......	N-W.	86·5	......	S-W.	87·5	......	S-W.	87·5	......	S-W.
1864	......	......	......	......	......	......	81·5	......	N-W.	91	......	S-W.	91·5	......	S-W.	89·5	......	W.
1865	64·5	......	N.	70·	......	S-W.	78·5	......	S-W.	89	......	S-W.	90·5	......	S-W.	88·5	......	E.
1866	69·5	......	S-W.	72·25	......	S-W.	87·5	......	S-W.	90	......	S-W.	89·75	......	S-W.	94·25	......	W.
1867	74	......	S-W.	76·75	......	S-W.	86	1·1	S-W.	88·5	1·4	S-W.	87·25	1·6	S-W.	90·5	5·65	E.
1868	74·25	1·14	S-W.	76·5	0·29	S-W.	84·5	0·15	S-W.	91·5	0·91	S-W.	90·5	1·64	S-E.	87·25	24·68	......

Records of Thermometer and Rain-gauge in Chyebassa.—(Continued.)

YEARS.	JULY.			AUGUST.			SEPTEMBER.			OCTOBER.			NOVEMBER.			DECEMBER.		
	Thermometer.	Rain-fall.	Wind.	Thermometer.	Rain-fall.	Wind.	Thermometer.	Rain-fall.	Wind.	Thermometer.	Rain-fall.	Wind.	Thermometer.	Rain-fall.	Wind.	Thermometer.	Rain-fall.	Direction of Wind.
	°	Inches.		°	Inches.		°	Inches.		°	Inches.		°	Inches.		°	Inches.	
1858	82·75	......	S.	84·	......	W.	83·375	......	S-W.	79·75	......	W.	69·875	......	W.	64·	......	S-W.
1859	86·	......	S.	84·	......	S.	86·	......	S.	83·	......	S-W.	72·5	......	N.	66·	......	N.
1860	87·	......	S.	83·	......	S-E.	81·25	......	S-E.	78·25	......	S-W.	72·5	......	N-E.	64·	......	N-E.
1861	81·5	......	S-W.	82·5	......	N-E.	80·5	......	S-W.	77·	......	N.	69·	......	N.	63·	......	S-W.
1862	80·5	......	W.	79·25	......	S-W.	78·5	......	S-E.	76·	......	N-W.	71·	......	N.	61·25	......	N.
1863	83·5	......	S-W.	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
1864	86·25	......	S-W.	85·75	......	S-W.	84·25	......	S-W.	81·25	......	N-W.	74·	......	N.	68·75	......	S-W.
1865	88·75	......	E.	88·25	......	E.	85·5	......	S-E.	84·5	......	S-W.	76·5	......	S-W.	69·	......	W.
1866	84·75	......	E.	85·	......	E.	86·25	......	E.	84·75	......	S-W.	79·75	......	S-W.	71·5	......	S-W.
1867	86·75	7·91	E.	86·	19·	E.	88·	6·92	......	84·5	4·46	S-W.	78·5	0·39	S-W.	72·5	Nil.	S-W.
1868	88·75	8·13	S-W.	86·	9·72	S-W.	85·	15·33	E.	85·	0·12	S-W.	78·	Nil.	S-W.	72·25	Nil.	S-W.

METEOROLOGY, CLIMATE, &c.

" The temperature and direction of the wind were taken in the jail by the native doctor. The thermometrical observations, which are registered from a common thermometer, may be relied on so far as the temperature in the jail wards is concerned. The rain-fall, which has been registered since March 1867, has been registered by me in my house.

There was nothing peculiar in the past season, but in June the rain-fall was very heavy.

Climate of Chyebassa. The cold weather sets in usually at about the third week in November, (October is certainly a hot month) and lasts till about the first week in February. The cold weather is very mild. February and March are bearable, especially when a shower or two of rain falls, but April, May and June are almost unendurable. In April a westerly hot wind blows, and is scorchingly hot. In May the weather is generally calm, which is worse than the hot winds. I do not think there is any hotter place in India during these two months. By about the middle of June the rains may be said to have set in, lasting till about the end of September. With the exception of the hot winds, and the hot weather, intensified by the surrounding hills, I don't think there is any other peculiarity in the climate, and it has not much influence on the appearance or disappearance of particular diseases; at the close of the rains perhaps cases of fever increase, and diminish during the cold weather."

IRRIGATION, CROPS, WELLS, &c.

Some of the wells of this place are very deep. Of eighteen wells measured, the depth (to the surface of the water) ranged from about seven to twenty-seven feet; from fifteen to nineteen feet being the most common. The depth to the bottom ranges from twenty-five to forty feet. The wells are cleaned out whenever it is found necessary, but not systematically.

" Proportion of cultivated to uncultivated land.*

Area cultivated	1,332	Square miles.
„ culturable	1,776	Total uncultivated 3,171 square miles.
„ unculturable	1,395	

Irrigation is not carried on to any extent. Wells are not used for purposes of irrigation. Tanks cannot be said to be numerous, but some exist."

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* According to the survey of Captain G. C. Depree.

SANITATION, CONSERVANCY, &c.

"Chyebassa is, in a sanitary point of view, all that could be wished. All the conservancy arrangements necessary, and in use, are a couple of bullock carts for carrying away the sweepings of the streets; there are so many open fields around that no accumulation of filth takes place, at any single pot, and the population is not so great as to cause any fear on this point."

"There are no local causes of malaria, and if any, is ever detected, it is immediately removed. No broken ground, hollows, stagnant ponds; and if any brush-wood or high grass is seen near the station, it is quickly cleared away. I refer in the above to the civil station, and there is no jungle nearer than three miles round; but then the district is all jungle.

I cannot speak very highly of the character of drinking water; it has often a musty saltish taste; for our own use we are always obliged to filter it through sand and charcoal, otherwise it is hardly drinkable; this is for the well water, the only source from which we use it, not making use of tank water. Bathing is allowed in all the tanks, but no other impurity is allowed to enter the two tanks used for drinking purposes. The tanks are not enclosed in any way ; and there are no drains near them. The ground around them is clean, and with the exception of common grass no vegetation is near. They are not contaminated by any animal impurities, no animals are allowed to enter them, and no steeping of *jute* or the like carried on in them. The only source of their pollution is the use allowed of bathing in them.

No drains, cess-pits or public latrines exist, and private privies are very few indeed; the people usually answering the calls of nature out in the fields at a distance."

CREMATION AND INTERMENT OF THE DEAD.

"The bodies of those dying in Chyebassa are burnt near the river, at a good distance from all human habitations. It is very carefully done, and unless thoroughly burnt and the ashes removed and buried, it is not left by the friends. The Coles, however, burn the bodies within their respective villages, and, collecting the bones, bury the ashes on the spot. Those dying of small-pox or cholera are not burnt at all, by any of the castes, for fear of infection, but buried instead, thus departing from their usual custom on sanitary grounds. This is not enforced on them by authority, but is done by free choice, the people, especially the Coles, having a horror of these two diseases."

"Interments also take place at some distance from human habitations in Chyebassa, but in Cole villages at or near the village, under some large tree, usually the tamarind, the spot being marked by a large stone. The Mahomedans bury their dead at a depth of five or six feet (up to the shoulders) but the other castes to no very great depth, two or three feet at most. The Coles who bury the bones some days after cremation, use a good large and deep excavation, as it has sometimes to contain a large quantity of rice and other eatables. The *Bustom* caste, although Hindoos, are never burnt, but buried in a sitting posture, and not too deep either, as the head is often no more than a foot or less under ground, and dogs and jackals easily reach it. Corpses are never thrown away on any account. The Coles especially respect their dead.

I cannot say there are any nuisances dangerous to health at Chyebassa. The only objectionable articles that may be placed under this category, are the *tusser cocoons*, which the purchasers collect sometimes in large quantities, in their shops before exportation. These, if proper care be not taken to keep them well dry, emit a most offensive smell; but the traders, for their own advantage, generally take care that they are well dry and free from smell, as otherwise they get spoilt and decrease in value.

The atmosphere of Chyebassa is not tainted, and there are not many unpleasant odours perceptible.

The Coles must have their daily quota of *hureah* or rice beer. They live more on this than on any other diet, taking very little rice, but a good draught of this *hureah* at meal time. When going out to their fields to work they take a quantity of it for their meal, eating nothing else.

This *hureah* is made in this way. After the rice is well boiled, it is spread out on mats to cool, then mixed with a small quantity of a substance called *kanoo* made from the root of a particular jungle plant, which is made into a paste and then allowed to settle in water, the sediment is then made into balls and dried. The rice thus mixed with the *kanoo* is put in earthen *chatties*, filled to the brim, and allowed to ferment for three or four days, according to the strength desired, it is then pressed through a bamboo sieve, with a sufficient quantity of water, and drunk *ad libitum*. It is more intoxicating if the rice is allowed to ferment longer, or less water is added at the time of straining it, but otherwise one or two quarts are drunk at once without much effect. Those that drink it say it is very nutritious, and the Coles who use this stuff very commonly, (taking as it does the place of their food,) are strong, muscular, able-bodied men."

GENERAL MODE OF LIFE.

" Promiscuous indulgence in sexual intercourse has caused a great deal of venereal infection in the station, and it is so wide-spread that there are no bounds to it. There can be no doubt that most, if not all the people living in the bazaar have had syphilitic infection at one time or another. Marriage is a thing but in name, and immorality is the prevailing vice. Two castes I must except from this, *viz.*, the Oorowns or *Uraons* and the Coles. These keep themselves aloof from other castes, but are freer still among their own. This exclusiveness, however, protects them from venereal affections, as I have found it very rare among them; a strong contrast with the other castes.

Drunkenness is also a prevailing habit. This is indulged in alike by all castes, Mahomedans, Hindoos and Coles. The latter and the Oorowns are especially hard drinking. They indulge in it whenever they get an opportunity, and the money. I have seen these people gulp down a large dose of pure brandy that would put to shame a *gin-bibber.*

UNWHOLESOME LIQUORS.

Only two kinds of liquors are manufactered here, one is the *hureah* before described; the other the wine distilled from the fruit of the *mowah* tree. The *hureah* is the convenient drink of the Coles, Oorowns and other alien castes, as Tamareahs, Sonthals, &c., as it can be brewed in their own houses, but the *mowah* has to be purchased, and they cannot afford to indulge in it very often; but they prefer it, being more intoxicating, and they buy it whenever they can spare a few pice. Intemperance is very common.

VACCINATION, INOCULATION.

Before 1867 vaccination was carried on by the Civil Surgeon and his two native doctors, and as there was no other agency it was limited to the civil station. In the beginning of 1867, when small-pox was raging in certain parts of the district, and inoculators were performing inoculation, an attempt was made to induce these inoculators to vaccinate; some accepted the proposal, and very many were vaccinated through their means throughout the district. In 1867 Government sanctioned four paid vaccinators for the district, and four *brahman* inoculators were engaged for the purpose. These vaccinators were placed under the Superintendent of Vaccination of the Ranchee Circle. During the last vaccinating season three vaccinators were employed in the district under the control of the Civil Surgeon, but in the present season they have been sent to the Superintendent of Vaccination, who intends keeping his staff of vaccinators in one district at a time.

The following are the statistics I can furnish since the introduction of the system of employing inoculators for vaccinating.

For 1867.

Total number vaccinated.	Number successful.	Number unsuccessful.	Result not known.
7,639	4,436	85	3,118

For 1868, *During January, February and March.*

Total number vaccinated.	Number successful.	Number unsuccessful.	Result doubtful.
2,893	2,833	47	13

The greatest prejudice against vaccination entertained by the people is based on its ill success. In my report on the epidemic of small-pox in 1867, I remarked, 'the heads of the villages now come of their own free will and ask to have vaccination performed in their village.' After all the enquiries I could make it does not appear that they have any objection to vaccination so long as it is performed by *brahmans*; their only fear is that it should not succeed, and they are not much to blame for this, as vaccination repeatedly failed in this district, both in my hands and in those of my predecessors. Inoculation is practised very extensively all over the district, and, in any outbreak of small-pox, inoculators flock in for the purpose, or are specially invited by the zemindars to inoculate the villagers. I remarked on the result of inoculation in my before-mentioned report that 'the inoculation that had been pursued has produced very mild results. A few have had just a few pustules sprinkled about their bodies, and a great many I saw had not a sign of eruption, although they had been inoculated for some days.' Inoculation will hold its ground among the people of the district for some time yet, *i. e.*, until vaccination succeeds more thoroughly than it has done.

EPIDEMICS.

"With regard to the past history of epidemics in the Singbhoom District, I find the following records'

In 1860. An epidemic of variola.
In 1861. An epidemic of cholera.
In 1866. An epidemic of cholera.
In 1866-67. An epidemic of variola.

The epidemic of small-pox in 1860 commenced among the prisoners, in March, and terminated in May, two sporadic cases, however, occurred in January and February. The epidemic prevailed generally throughout the district. The disease commenced at Chyebassa among a detachment of sepoys who had gone to Ranchee on duty. There were comparatively few cases among the prisoners.

The first case in the jail occurred on the 18th January 1860, the second on the 8th February, the third on the 17th March, and the last on the 15th May. There were twenty admissions in all, and ten deaths."

The small-pox epidemic of 1866-67 commenced in the month of *Kartick* (October 1866,) and disappeared about the end of January 1867.

The civil station was perfectly free from it, some four or five villages were the greatest sufferers from this epidemic. So far as it could be ascertained at the time, 280 cases occurred and eighty-five deaths." It is recorded of this epidemic in my report at the time, "the great mortality, I am afraid, is owing more to the manner the patients are treated than to the character of the small-pox. In almost all the cases that I saw it was not of a severe nature, but rather a mild form of small-pox, but when a person is attacked, and the pustules have appeared, he is covered all over with ashes, and exposed almost without clothing to the sun. Very many again are rubbed over with turmeric. This is the treatment pursued and no more.

The cholera epidemic of 1861 broke out just before the periodical rains. The first case occurred in jail on the 19th June, and the last on the 3rd August, sixteen cases were treated in jail, and eight deaths occurred. In the town and its vicinity more than 100 perished.

The cholera epidemic of 1866 was more severe, and extended over the whole district. The first case occurred in the jail on the night of the 17th

March; the second on the 20th, from which date it went on increasing till the 24th, when it was at its height, and stopped on the 27th. The prisoners were removed from the jail on the 24th, and on the 25th there was an apparent improvement. On the evening of the 28th there was a strong southerly gale, but no rain. On the evening of the 29th a strong north-wester with rain. There were twenty-five admissions this month, and fourteen deaths from cholera in jail. During this month there was no cholera in the station, and the jail was the only place where it broke out.

In the month of April only one case occurred; the patient recovered.

In May the epidemic became general, and had spread almost over the whole district. In the jail it commenced on the 9th, continued uninterruptedly till the 3rd June, when it disappeared for a few days, appeared again on the 13th and 14th, again disappeared for a fortnight, again breaking out on the 27th June, it stopped on the 8th July, reappeared on the 17th and continued till the 8th September when it ceased. In October, however, five more cases occurred. These intermissions were, a great feature on the character of the epidemic and were sudden, not showing any signs of subsidence or mitigation, for the last cases were of as virulent a type as the first, after each intermission.

The character of the disease was of the worst form, 136 cases occurred in the jail, with eighty-four deaths."

30.—HAZAREEBAUGH.

THE REPORT IS BY DR. S. DELPRATT, CIVIL SURGEON.

"Hazareebaugh.—*Latitude* 24°′ *North.*—*Longitude* 85°24′ *East.*

Hazareebaugh itself is considered healthy.

In former days when troops were first quartered here, it was proved to be most unhealthy, from the close proximity of the jungle, and the absence of all sanitary arrangements; since it has become a Civil and Military Station, the jungle has been entirely cut down, and the place opened up for a distance of several miles circuit. Improvements have of late years been very gradually made, and the cantonment and civil station, which, until the autumn of 1866, were hemmed in on almost every side, by thickly-packed and irregularly built bazaars, have been relieved of these nuisances, which I believe, generated and most certainly intensified and propagated disease, and the whole of these encircling bazaars have been levelled, and a new town regularly built The Deputy Commissioner has, in the creation of the new town, shewn excellent sanitary judgment, by not allowing the town to be made a settlement of squatters, who should take a piece of ground and build a hut just in any way the occupant pleased, but has followed a systematic plan, and the town is now made up of long wide streets extending in length for nearly two miles. Of these there are three rows, with several broad cross streets intersecting the main roads. By this plan, free ventilation as well as regularity in construction is attained, and light and air made more abundant and useful. Cleanliness being thus possible, the general health of the population has been much improved as contrasted with former years. These remarks apply to the station itself, the villages remain much in *statu quo*, and I doubt there being any perceptible difference between the past and present condition of the hamlet, in the interior, or of the larger towns.

I attach a statement shewing, the sickness and mortality for 1867 and for the past eleven months of the present year. These statistics are taken from the dispensary returns, and must be considered as limited in extent though correct in detail."

Statement of sickness and mortality in the Dispensary at Hazareebaugh, for the year 1867, *and eleven months of* 1868.

	Diseases.																				
	Anasarca.	Animal bite.	Ascites.	Bronchitis.	Burning.	Cholera.	Colica.	Contusio.	Debilitas.	Diarrhœa.	Dysenteria.	Dyspepsia.	Enteritis.	Febris Intermittens.	Febris Remittens.	Febris Continua.	Fractura simp.	Fracture, Compound.	Gangrena.	Gonorrhœa.	Hæmoptysis.
Admissions from 1st January to 31st Dec. 1867	4	2	1	46	10	6	9	37	6	25	43	23	10	328	25	...	9	1	7	10	2
Admissions from 1st January to 30th Nov. 1868	1	1	3	80	11	10	12	21	6	33	46	23	2	410	27	3	7	1	...	20	2
Grand Total ...	5	3	4	126	21	16	21	58	12	58	89	46	12	739	52	3	16	2	7	30	4
Deaths from 1st January to 31st December 1867	...	2	...	...	1	5	1	...	1	6	5	...	1	1	2	...	...	1	3	...	...
Deaths from 1st January to 30th November 1868	1	...	2	3	...	4	...	...	...	4	3	...	...	1	...	2	...	1	...	...	1
Grand Total ...	1	2	2	3	1	9	1	...	1	10	8	...	1	2	2	2	...	2	3	...	1

	Diseases.																				
	Hepatitis.	Icterus.	Lumbago.	Neuralgia.	Ophthalmia.	Otitis.	Obstipatio.	Paralysis.	Phlegmon et Abscessus.	Phthisis Pulmonalis.	Pleuritis.	Rheumatismus.	Scorbutus et Purpura.	Scrofula.	Syphilis Primitiva.	Syphilis Secondaria.	Splenitis.	Ulcus.	Variola.	Vulnus, Contusio.	Vulnus Incisum.	Total.
Admissions from 1st January to 31st Dec. 1867	10	2	13	8	25	15	34	8	30	6	7	53	10	8	22	18	31	195	18	...	14	1,131
Admissions from 1st January to 30th Nov. 1868	9	1	13	...	25	4	125	4	32	9	5	66	6	3	29	17	90	158	5	19	19	1,358
Grand Total ...	19	3	26	8	50	19	159	12	62	15	12	119	16	11	51	35	121	353	23	19	33	2,489
Deaths from 1st January to 31st December 1867	...	1	...	...	1	...	...	...	1	3	...	1	...	1	...	...	...	4	3	...	...	44
Deaths from 1st January to 30th November 1868	...	...	...	...	...	...	...	1	...	4	...	1	1	...	...	...	1	1	...	...	...	31
Grand Total ...	...	1	...	...	1	...	...	1	1	7	...	2	1	1	...	...	1	5	3	...	...	75

"As no registers of deaths in the district have been kept, exact information regarding the mortality of the district generally, cannot possibly be furnished. A most intelligent native gentleman informs me that he would give the mortality of the whole of the district, for 1867 at 8,000 or twenty per *mille*, and for the portion of this year among the same number of population, at fifteen per thousand, *viz.*, 6,000. As mortuary returns are not known here, I must necessarily consider the information as only guess-work, and distrust its correctness. The mortality in 1867, which is given as much greater than in 1868, is probably correct, owing to the scarcity of food in the previous famine year, the effects of which might have shown themselves in the former of the two years.

The specific nature and identity of prevailing disease, as far as the station and its near neighbourhood is concerned, is shown in the statement appended. The death rate from specific causes for the district, in the absence of mortuary returns, cannot be given.

No disease can be said to be peculiar to the district. Spleen, fever and dysentery are very common. Elephantiasis is rarely met with, and only one or two cases of leprosy are to be seen.

Nothing can be said with the smallest degree of accuracy on the subject of infantile mortality, there being no registration of births; but I am gravely told that among five births, three die, out of which number two are male and one female.

In the first four months of 1868, measles prevailed rather extensively in the town, both among Europeans and natives, I believe the disease was brought from outside. During part of April and May, a few cases of cholera presented themselves in our town. It was clearly proved to have been introduced by travellers from the south, one of whom died on arrival, and his companions were almost immediately afterwards attacked by the disease, and one person, a resident of the place, who lived in the same enclosure with the affected patient. Whooping-cough was rather prevalent in Hazareebaugh about May, June, and July, and was brought in by a child from Dinapore, who had there associated with children suffering from the disease; a fresh accession of the disease was subsequently observed, after the arrival of other children from Dinapore. From 20th June to the end of August, cholera visited the town of Echak, eight miles north of Hazareebaugh. It was reported to your office at the time. No connection could be traced between the outbreak at this station and the appearance of the disease at

Echak. It subsided in the latter town, and no cases were reported from any other part of the district. In September and October, fevers have been rife but this is not unusual in this district.

The health of the Police has not been so good this year as the last, or perhaps I should be more correct in saying that the amount of sickness has been greater in 1868 than in 1867. The average strength of the force for the past eleven months has been 689·18, the average of sick has been 15·35. Ratio of sick per thousand to strength, and of mortality to strength ·870.

The people are not generally healthy looking. They are a puny and miserable set, poor and very indolent; I do not consider that there is any improvement in the health of the population generally in the district; that of the inhabitants of the town and cantonment is perhaps better now than in former days.

The present population of the district is estimated at 400,000 souls.

Men.	Women.	Children.		Total.
		Male.	Female.	
175,000	160,000	45,000	50,000	400,000

These figures are based on the registers kept in the Police Thannahs. I question their reliability; there is no registration of births and deaths.

It is a thriving population, apparently, in spite of the indolent habits of the generality of the people. Until lately the population has been particularly stationary, but of late years, since the cooly depôts have been opened in this district, a large number have emigrated for the Mauritius and the tea gardens of Assam. The area of the district is set down at about 12,000 square miles.

The general altitude of the district is 1,900 feet. That of Hazareebaugh varies from 1,998 to 2,010.

The sub-soil water is tapped at an average depth of twenty-one feet from the surface."

"The banks of all the rivers are generally lower than the level of the surrounding country.

The numerous rivulets running to the three main rivers of the district carry off the rain as soon as fallen, and little is left to fall into the light open sub-soil. I have never known any general flooding of any portion of the district. The irrigation of the country is not dependent on rivers or canals. Owing to the undulating nature of the country, water is deposited in the low grounds,* during the rains, and retained in what are termed "*ahars*," which are formed by excavating earth, and raising mud on the sloping sides, thus making miniature lakes or ponds according to size. The water so secured in these "*ahars*" is generally used, as long as it lasts, by the people for irrigation purposes. These "*ahars*," with few exceptions, become dry for want of rain water. I am told this system is universally adopted in the Purgunnah of Khurruckdeah. Wells are seldom used for purposes of irrigation in other parts of the district, save for the Government poppy cultivation. The crops being thus dependent almost entirely on the rain-fall, and there being no adequate storage of water, they necessarily suffer when the fall of rain is small in quantity. None of the interferences mentioned as likely to affect the natural drainage of the country, such as embankments, &c., exist in this district.

This district is truly one of jungle. It is studded with marshes, swamps, and "*ahars*," which doubtless tend to promote, if not originate, disease. There are no marshes anywhere near Hazareebaugh, with one exception, and that is situated in dangerous proximity to the station, being only about a mile and a half out of the town, and to windward of it, and should, in the sanitary interests of the inhabitants, be thoroughly drained and got rid of. I do consider the numerous swamps and excavated basins, existing in the district, to be fruitful sources of disease. An elaborate system of drainage and the prohibition of the reconstruction of these temporary ponds, is about the only method of rectification I can suggest, as being at all likely to be effective. But would not the expense of this be a positive prohibition to such an undertaking, and would it be right to deprive the cultivators of their only means of irrigation, however primitive they may be? The proportion of irrigated to unirrigated land, I am given to understand, is as one of the former to three of the latter, and of cultivated to uncultivated as two to five. Irrigation is effected principally as before stated by a rude system of earth cisterns (*ahars*), and dependent to a great degree on the rain-fall. Wells are only used for this

* Gubrahs.

purpose by a few. During the hot months the average depth in those wells that retain water is about two to three feet. The wells, as regards construction, are generally of a temporary character, (*kutcha*)—*pucca* wells being very rare."

The proportion of *pucca* to *kutcha* wells may be estimated at five per cent. The former are found only in the principal towns; in the interior they are seldom seen. The wells in the district, with rare exceptions, become dry in the hot weather. Those that have springs at the bottom, never become actually dry, though the water is at times scanty; it can, however, be drawn from morning till a certain hour of the day. This depends much on the nature of the spring, the depth to which the well has been sunk, and the quantity of water drawn for daily consumption. Tanks are rather rare, but few are to be found, and those in the principal towns only.

Vegetation around is rich and plentiful.

Blight of crops is liable to occur for want of sufficient rain. When the rice plant is in the ear it is injured sometimes I am informed by insects."

CONSERVANCY, &c.

"Hazareebaugh, civil and military, and the immediate neighbourhood are in a generally good sanitary condition. Conservancy arrangements are very fairly carried out. Night-soil is carted away, streets are kept carefully swept daily, nuisances prohibited, and offenders punished. Butchers' shops and the deposition of offal narrowly watched, under the directions of the Deputy Commissioner, who is responsible for the sanitation and conservancy of the civil station, and by the military authorities in the cantonments. Outside the above limits, the subject cannot be taken up, for want of supervision, and the general apathy of the people themselves.

Much interest in these matters has been shown, by the heads of both the civil and military departments, for which I doubt the gratitude of the inhabitants.

The sanitary improvements of late have consisted in the total annihilation, and removal to another and well selected site, of the circumvenient bazaars, which hemmed the cantonments in, and the erection of a new town on an improved plan.

"Streets have been made wider, buildings constructed systematically, and on better designs. Drains have been opened out, *pucca* bridges built, trees have been planted in the larger streets, and the grain-dealers' *golahs* removed to an open spot, instead of, as formerly, in the heart of the town in a narrow street, on low-lying ground.

Tanks, which have no good drinkable water (in the town) should be improved. Meat should be sold in a good detached bazaar, where sheds might be erected for the purpose. Public latrines (if carefully attended to) might be made. The large towns, such as Echak and Chuttra (certainly the former, only eight miles distant) should be brought under some municipal management. The prohibition of inoculation by variolous matter should be enforced throughout the length and breadth of the district, as tending to diminish the risk of infection, and the propagation of the disease to the troops and European residents of the place. The question of the possibility of isolating certain affected localities, in time of epidemics, and the arming of certain local authorities with special sanitary powers at such times, might be made a subject of consideration with advantage to the people. The station is not considered malarious, but the low-lying villages, in some parts of the district, surrounded as they are by scrubby jungle, are particularly so, especially about and subsequent to the cessation of the rains.

By order of Government, no forest trees of any importance are allowed to be cut down, without the permission of the local authorities.

Drinking water is procured from wells and tanks in those places where the latter are found. Travellers constantly take water from puddles by the road-side, as do palkee-bearers on a *dâk*. The drinking water of the town and cantonment is considered excellent. Dr. Durrant, when analyzing the water of the station, considered it the best in the Division, quite free from iron, which was thought rather extraordinary, as iron abounds in the district, The natives highly appreciate the water supply of Hazareebaugh. The supply is deemed to be abundant in the town but deficient in some of the villages.

The water for drinking purposes is drawn from wells principally. These are *pucca* and kept clean at the station. Tank water here is used for culinary purposes. In the district water from *kutcha* wells is used. These are generally not deep enough. The majority run dry in the hot months. Where there are tanks, the water from them is used in the interior, for drinking, as well as for purposes of cooking. In the district, near some wells, heaps of dung and vegetable and other matters are thrown, consequently these are subject to contamination directly as well as by percolation. This was especially observed by me at Echak during the cholera outbreak of this year. In the heart of the city, in the yard of a hut, just outside the dwelling which cholera patients were inhabiting, around the *kutcha* well, I noticed small holes dug in the ground, within two feet of the well itself, in one of which was a quantity of fœcal matter; on asking the meaning of this, I was gravely told that it was used as the privy for females; that this was the usual custom of the town, and that as one of these holes became unpleasantly full, it was closed by earth being thrown on it, and another hole was dug close by; thus a fœcal dance has been in course of performance round this well, I suppose for years past. This is one well with choleraic *excreta* deposited around it. What can the state of such a town be (where this practice is said to be the ordinary practice every where) but a hot-bed of disease and a ready focus for disseminating it broad-cast through the town.

Surface drainage does pass into the tanks, but not into the wells.

Wells are usually surrounded by small *pucca* or *kutcha* walls or banks. There are drains around the tanks, which serve the purpose for which intended. In most of the wells distant from magisterial supervision, there is no grating or any other covering. The source of water-supply is cleaned out as occasion requires. No means are adopted for preserving the purity of the water in the district, decayed leaves are sometimes to be found on its surface.

At the station of Hazareebaugh, persons are not allowed to bathe in the government tanks, but there is no prohibition regarding tanks made by the natives. Except in the station, washing of clothes is allowed in all the tanks in the district.

Cattle are allowed to bathe and wallow in the water in the district. Pigs are also allowed to burrow in the mud where there are pieces of water. Sometimes steeping of jute or the like is carried on where people draw water for drinking or cooking purposes. Carcases of animals are never thrown into the water. The drainage-water of some of the villages, and of the town is unclean, I believe, from the various pollutions alluded to above.

(*c*) DWELLINGS, STREETS, &c.

"The ordinary dwellings of the people are *kutcha* buildings. Those of the poorest class are very wretched hovels, being low, ill-ventilated and generally dirty. The villages in the district are generally very well situated, being built on elevated sites."

"In Hazareebaugh the average width of the main streets of the new town from house to house is between 50 and 60 feet, and they are kept remarkably clean. In the towns, the average width is considerably less, not more I should think than 10 to 12 feet, and they are generally dirty.

The poorer classes live some five souls in a hut. They do not enjoy, I should say, more than 250 cubic feet of air."

DRAINS, CESS-PITS, LATRINES, &C.

The drainage of Hazareebaugh, which is on an elevated site, is carried off into a *nullah,* which encircles the town on three sides, and falls to the north into ravines. In the interior there is no system of drainage, saving that shallow trenches are dug along the length of the road which is generally carried to the nearest field outside the village, to which the water is conveyed as it may. The depth of the drains in Hazareebaugh are about three feet; in the villages they are simply superficial scratchings of the earth. In the town and cantonment, they are kept scrupulously clean; in the towns in the interior they are horribly filthy, and generally choked with decaying vegetation ; at least such was my experience of the town of Echak. They are cleaned as frequently as occasion requires in this town, but in the interior, I should say, they are never cleaned but left to take care of themselves. In the large towns and villages, I believe they are constantly obstructed and overflow, but in Hazareebaugh such is not the case. Most probably much of the fever and bowel complaint which prevails is a result of the imperfect drainage, which is found in the towns and villages. Well-privies do not exist in these parts. No public latrines exist in Hazareebaugh or in the district."

Meteorological and Sanitary Notes, Hazareebaugh, 1868.

Months.	Weather, Storms, &c.	Diseases.	Epidemics.	General result.
January ...	Cloudy, breezy, dry, sudden changes at end of month	None special	None	Healthy.
February ...	Cloudy, stormy, dry	....	....	Ditto, but trying on old and feeble.
March	Changeable in medium month, dry .	....	....	Ditto.
April	Cloudy, close, changeable, dry ...	....	Cholera, sporadica, chicken and small-pox ...	Ditto.
May	Many and sudden changes from hot and dry to moist, rain and storm	....	Ditto and measles and hooping cough	Ditto.
June	Unremitting rain from 15th to 19th.	....	Ditto	Ditto.
July	Hot, close days and stormy, rainy alternately	Fevers, increased, dysentery and rheumatism begin ...	Epidemics begin and cease, Gangrenous ulcers appear.	Increase of sick, chiefly blood and bowel diseases.
August ...	Ditto	Ditto	Ditto	Ditto
September ...	Ditto	Ditto and lung affections ...	Ditto	Ditto.
October ...	Dry, cool, pleasant	Fevers still severe, other diseases subside... ...	None	Healthy.
November ...	Ditto	Marked improvement in health	None	Those worn out, with organic diseases, are unable to resist the cold.

Meteorological Notes, Hazareebaugh, 1868.

MONTHS.	BAROMETER.		Maximum in Sun in Vac.	Mean Maximum Thermometer in shade.	Mean Minimum Thermometer in shade.	Mean dry half in shade.	Mean wet half in shade.	Rain.
	Mean Maximum.	Mean Minimum.						
	°	°	°	°	°	°	°	inches.
January ...	28·110	28·030	130·6	72·1	50·0	66·0	56·5	·26
February ...	28·040	27·960	132·2	74·8	53·1	68·3	58·4	·97
March ...	28·030	27·940	137·2	86·2	62·3	79·3	62·4	·64
April ...	27·817	27·870	146·2	94·9	70·5	88·5	67·1	.....
May ...	27·920	27·850	150·6	97·3	72·2	87·8	71·1	1·54
June ...	27·740	27·680	141·5	88·6	73·4	82·8	75·6	15·02
July ...	27·550	27·530	146·4	90·1	74·8	81·6	76·3	10·39
August ...	....	....	145·0	87·0	73·3	78·7	75·6	11·70
September ...	....	....	145·9	86·8	72·6	78·3	74·6	9·10
October ...	27·877	27·866	140·2	84·90	66·80	75·3	65·5	0·53
November ...	28·001	27·936	134·5	78·1	63·8	68·6	58·1	......

31.—BHAUGULPORE.

THE REPORT IS BY DR. T. P. WRIGHT, CIVIL SURGEON.

“Bhaugulpore—*Latitude* 25° 15′ *North*—*Longitude* 87° *East.*

4. There are no trustworthy statistics, but there is a general impression that it is rather less healthy than of old, and especially that fever is more common and of a worse type than formerly.

5. The only returns of sickness and mortality, I have seen, are flagrantly and palpably erroneous.

8. Leprosy is somewhat common, perhaps about 5 per 1,000. Elephantiasis is very rare.

10. It has been an exceptionally healthy year.

11. Cholera usually appears about March or April and in August. It has appeared in every month. This year, 1868, it only came in November and December, and in the town it was only slight.

Fever.—Always stands first in regard to number during every month, and in every kind of practice. It is mostly of a slight intermittent kind, but there are many cases of a bad malarious type. Remittent fever is very rare, and continued fever is unknown.

The jail averages about 300 prisoners. The admissions for the year are only 229.

The Police average about 560 and the admissions are 409. Out of the 638 admissions in the two hospitals, 258 were fever cases, 62 dysentery, 47 diarrhœa, and 147 from other zymotic diseases.

During four years not one man has been admitted into the jail who has weighed two maunds. Many have been under one maund, and it is rare to find a woman in jail weighing more than 42 or 43 seers.”[*]

Dr. Wright remarks on question 13, that the last clause of it merely repeats question No. 4.

The population in 1842 was said to have been 52,000. But Dr. Wright places no reliance on the accuracy of such an estimate.

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[*] *Note.*—2 Maunds = 11 Stone 6 lbs.
1 Maund = 5 Stone 10 lbs.
42 Seers = 84 lbs. = 6 Stone.

TOPOGRAPHY, &c.

"Water is found at thirty to forty feet.

There are great evils in the station itself, and I have tried many times to get something done, but I have lost all heart in the matter from seeing the utter uselessness of any kind of effort to improve matters, *e. g.*, about the very worst nuisance in Bhaugulpore is the government distillery.

To improve Bhaugulpore would cost (probably) ten times as much as the fee simple of the whole place is worth. I fancy that the greatest Engineer in the world, with all the municipal revenue of London at his back, would have great difficulty in regulating the drainage, if he had the Ganges instead of the Thames to deal with. No one can tell within a mile where the Ganges may rise to, or how far it may fall. Still less can any one say what would have to be done if the Thames suddenly retired a few miles into Surrey. Ten years ago the river was so close to the station that people could walk on board the river steamers. Now it is so far off that it takes sixteen men about two hours to carry a *palkee* to the edge of the water."

METEOROLOGY, CLIMATE, &c.

"The few meteorological observations which are available here are put into Appendix A. The observations have been made by the Civil Surgeon, Sub-Assistant Surgeon and the Jail Native Doctor. They are very meagre, but fairly trustworthy as far as they go.

The peculiarity of 1868 has been the want of regularity in the distribution of the rain-fall, which is producing a very bad effect on the price of grain, and which threatens to bring about a great scarcity, though not, it is hoped, an actual famine.

The climate of Bhaugulpore is generally considered very good. There is little, however, to mark its difference from other Behar stations. Hot winds blow in most years for about a month in March or April. The thermometer outside the house goes down to 43° or 44° about twenty-five or thirty times in the year at sun-rise, and inside the house in the heats of May and June it usually reaches 100° about six times a year.

The average rain-fall and heat of different months is shown in the Appendix.

No other instruments have been supplied to Bhaugulpore than a common thermometer, and a common rain-guage,—the two together being worth perhaps, seven shillings in England."

"I have never been able to trace any special connection between meteorological phenomena and the occurrence of disease. I entirely mistrust the statements which go to prove the existence of such connection.

Tanks are moderately numerous in Bhaugulpore, much less so than in Bengal Proper, and considerably more so than in the North-West Provinces. They are moderately well kept and are not the nuisances as they are at Chittagong or Hooghly."

Average Temperature of each month for four years 1865-68.

MONTHS.	1865.		1866.		1867.		1868.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
January	76°	58°	72°	54°	72°	56°	72°	50°
February	80°	64°	81°	56°	78°	46°	76°	58°
March	94°	64°	96°	72°	86°	52°	94°	60°
April	98°	72°	92°	72°	96°	72°	96°	73°
May...	93°	76°	102°	77°	99°	72°	98°	73°
June	96°	80°	100°	81°	97°	77°	96°	79°
July...	92°	82°	90°	80°	88°	76°	94°	80°
August	92°	82°	90°	82°	90°	80°	91°	79°
September	85°	80°	88°	82°	89°	80°	92°	78°
October	88°	74°	88°	72°	86°	70°	88°	70°
November	82°	60°	80°	63°	80°	60°	78°	63°
December	74°	56°	70°	52°	71°	54°	71°	55°
Average of year ...	......	79°$\frac{1}{3}$	......	87°$\frac{5}{6}$	.....	76°$\frac{1}{8}$	......	77°$\frac{2}{3}$

		1865.	1866.	1867.	1868.
RAIN-FALL OF EACH MONTH.	January	1 day ·15 inches.	4 days 2·10 inches.	3 days ·1 inch.	3 days 0·21 inches.
	February	3 days ·80 ,,	7 ,, 3 0 ,,	4 ,, 1·80 ,,	7 ,, 1·24 ,,
	March	3 ,, 1·50 ,,	....	4 ,, 1·20 ,,	5 ,, 0·24 ,,
	April	5 ,, 3·60 ,,	7 ,, 4·50 ,,	5 ,, 1·80 ,,	6 ,, few drops.
	May	5 ,, 9·50 ,,	1 ,, ·10 ,,	6 ,, 2·40 ,,	9 ,, 5·78 inches.
	June	6 ,, 6·10 ,,	13 ,, 20·40 ,,	15 ,, 12·40 ,,	16 ,, 5·41 ,,
	July	24 ,, 16·60 ,,	20 ,, 11·40 ,,	28 ,, 10·55 ,,	19 ,, 12·24 ,,
	August	15 ,, 16·0 ,,	21 ,, 12·20 ,,	22 ,, 5·0 ,,	17 ,, 18·07 ,,
	September... ...	9 ,, 9·20 ,,	17 ,, 13·70 ,,	16 ,, 10·44 ,,	17 ,, 6·06 ,,
	October	....	6 ,, 4·80 ,,	7 ,, 2·08 ,,	....
	November... ...	....	....	2 ,, 0·34 ,,	....
	December	2 ,, 90·0 ,,	....	....	....
	Total of each year ...	73 days 63·45 inches.	96 days 72·20 inches.	112 days 48·65 ,,	99 days 49·25 inches.

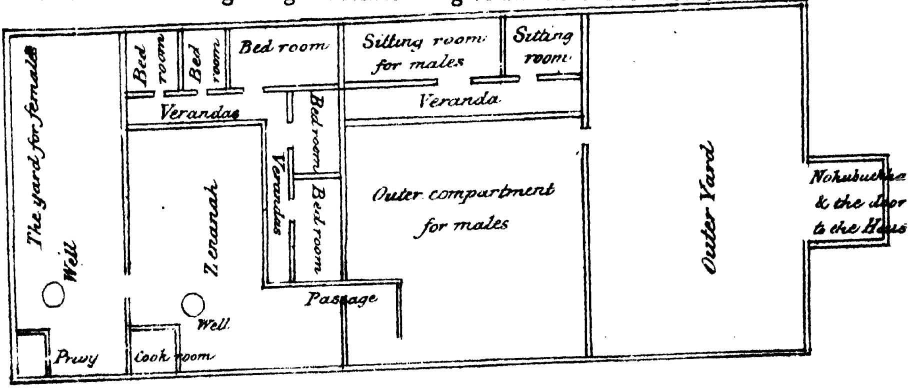
"Prevailing winds in Bhaugulpore, always easterly and westerly, differing somewhat in their relative proportions, but never less than 315 to 330 days in the year, in the aggregate.

The produce of the past year was a little below that of most former years. The extensive failure of the present *rubbee* crops will largely reduce the average produce of the present year.

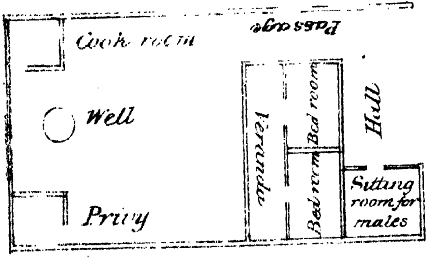
SANITATION, CONSERVANCY, &c.

The dwellings of the people whether, *pucca* or *kutcha,* are devoid of any arrangements for ventilation. The large houses are generally within high enclosures; and the rooms have only one opening in each. There are three classes of native dwellings.

1st. Those in which the very rich people live, which are massive *pucca* buildings, invariably having two departments quite separated from each other by means of walls, but sometimes they have other enclosures near about. The following rough sketches will give an idea of such houses :



2nd. Those small houses in which the middle class people live. These are either *pucca* or *kutcha,* or something between the two (this last having mud walls and *pucca* roof).



These houses also have no ventilation in the rooms, and these are very dark, sometimes requiring a lamp all day and night.

3rd. The huts of the poor are built in open places, having no enclosures. They are generally small, and have one door, but having no verandah, there is generally more light in them than in *pucca* rooms of the rich and middle classes of people.

The privies in all these houses are made of wells, in which the dirt accumulates for years, only the lower class people not being able to procure privies resort to open places or jungles near their huts. No judgment is shown in the matter of their site, elevation, structure, &c."

"The general condition of the place is not so satisfactory as might be desired; but, on the other hand, it is very much better than that of many other places.

Bhaugulpore is not a compact city, has no crowded and regularly built bazaars; but is, on the other hand, a conglomeration of many villages within a certain boundary. It is spread over an enormous area, and the population, as compared with the area, is very scanty, while the people are almost uniformly poor, and the rateable property in possession of each is exceedingly small. From these circumstances it follows that there must be a great extent of public road to be kept up, and also that a large number of Municipal Police is required, and in practice it is found that, when these two expenses have been met, the balance available for the general improvement of the town is extremely scanty.

The Municipal Commissioners are responsible for the management of the municipal funds, and of the working of their bye-laws. There is no great interest felt in the matter. In fact it is extremely difficult to get a meeting together for any purpose. One native gentleman takes much interest in fining his fellow townsmen for breaches of bye-laws, but that is only an exceptional idiosyncracy on his part. Most of the members feel (as I do very strongly) that municipal-self government is at present a mistake. The whole executive management is, and must be in the hands of the Chairman, who would do it equally well in his capacity of Magistrate. In my opinion if the Magistrate is an active man in body and mind, he is only hampered by the addition of a consultative body like the Commissioners, whereas, if he is indolent in either way, there is no power vested in the Commissioners to make him work. The Commissioners in no sense represent public feeling. They are appointed by the Government and are responsible only to it. The rule seems to be that the Commissioners meet and talk a good deal, but everything which is to be done has to be done by the Chairman and supervised by him while it is being done, or else left undone, and whether it is done or left undone must almost entirely rest with the Chairman as the sole executive officer, and as the only one who is daily accessible for orders and for the reception of reports."

Latrines have been built in several quarters, and those for males are fairly resorted to. Conservancy carts have been increased in number and efficiency The roads have been somewhat better looked after, and they and their vicinity have been kept more clear of filth. Some jungle has been cleared away, and some petty nuisances have been abated; offences against decency have been to a certain extent, discouraged, and any very bad smell has been looked to carefully, always provided that the originator of it was not a person of any particular importance.

I know of no way of making Bhaugulpore into a "Paradise" or an "Utopia.' There is much to be done by personal energy and personal restlessness on the part of the Magistrate, but very little that can be done by any one else. There was once a Magistrate here who could not sleep after some preternaturally early hour in the morning, and who had a mania for riding. He was always up early and always out, and no man knew when he was coming or what he was going to do next. Everybody was kept on the alert and in his short reign of about six months, more was done to improve the place than by all his predecessors and all his successors put together. I believe he had made an Eastern Bengal station into a kind of garden or park, and if he had stayed here five years, I think he would have done nearly the same, though he would have had great difficulties in his road. There is much broken ground, many hollows not filled up, stagnant ponds, high grass, and allo ther evils. Hercules would find plenty of scope for all his labours here,

Drinking water is obtained from the Ganges and from wells. It is generally of fair quality. The water of the wells is somewhat impregnated with nitre, common salt and some carbonate of lime in suspension.

The river-water available in the city is not from the stream of the Ganges itself but from a narrow canal left by the silting of the river. This canal gets stagnant and is separated from the main stream for most part of the year, communicating with the river proper only during the rains.

Wells are from thirty to forty feet deep; some getting exhausted during the hot weather. About twenty per cent of the wells are good; they are very much resorted to for drinking purposes, and as water is drawn away in abundance, that rising from the spring gets better; these wells are never under fifty feet in depth, some of them being about eight feet in diameter. The openings of these wells have a short surrounding wall of *pucca* masonry, not allowing the surface drainage to contaminate the water; some of these wells are very deep. I know one 115 feet deep. None of them are kept unclean; the natives take especial care that nothing calculated to vitiate the water is thrown into them.

The ground in the vicinity of these wells is, generally speaking, good. There is no direct contamination from animal and vegetable impurities to any marked extent, and the hard *kunkur* soil does not admit of much percolation.

The surface drainage does not pass into the wells.

They are generally surrounded by a short *pucca* wall. No regular drains exist near them, the surface water being very easily carried away to the river by the uneven ground.

The wells for drinking purposes are very often protected by iron or wooden gratings.

They are systematically cleaned out once every year, but where the water is very deep, no such thing is done."

ACCUMULATIONS OF FILTH, MANURE, STABLE-LITTER AND REFUSE MATTER GENERALLY.

"There used to be many accumulations of this kind, but they are being removed by the municipality. Nine carts go round every day, and these accumulations are removed as much as possible, though not systematically. The refuse is taken to places where there are ditches, for the purpose of filling them up. The manure of animals is deposited on the side of the roads, and taken away by the municipal carts."

CREMATION AND INTERMENT OF THE DEAD.

"The bodies are burnt on the banks of the Ganges, in one extremity of the city; it is not done carefully; bodies are interred all over the town at a depth of some five feet. No corpses are ever thrown into streams or pools near is in many places human dwellings.

The practice of burying the dead promiscuously, is in many places, very injurious. There has been an effort to stop this custom altogether, but from want of funds the municipality could not procure suitable land for the purpose in the various localities where it was required, in order to close the many burial places now in existence.

" The first class houses are made of burnt bricks and mortar of lime and *soorkee.* The second class ones are either of burnt bricks and mud mortar, or the walls being entirely of mud, the roof is *pucca.* These sometimes have tiled roofs. The third class houses are huts with a room tiled or made of grass.

The houses, are generally raised from two to four feet above the ground.

The average width of the roads is from ten to sixteen feet; they are fairly clean, but very dusty after dry weather.

On an average, eight persons live in each dwelling house, enjoying from 500 to 800 cubic feet of space. They are quite overcrowded.

The houses of Brahmans are generally clean, but those of other classes are extremely dirty, there being always one or two ditches in the compound, where all the sweepings and the remains of food and washing water are thrown, year after year, and allowed to putrefy, perpetually giving out unwholesome gas. The rooms are generally unclean.

The dwellings are not at all ventilated. They are lighted by a *cherag* or a cup, having one side of it pointed, on which is laid a wick, and in the cup there is some castor oil."

DRAINS, CESS-PITS, LATRINES, &c.

There are no properly constructed drains in Bhaugulpore, but there are *kutcha* ones on both sides of the roads, which were made for the purpose of taking earth for the roads, and without much attention to the level of the ground.

These drains communicate with the Ganges on the north, and the Chundun on the west, and their waters get into those rivers.

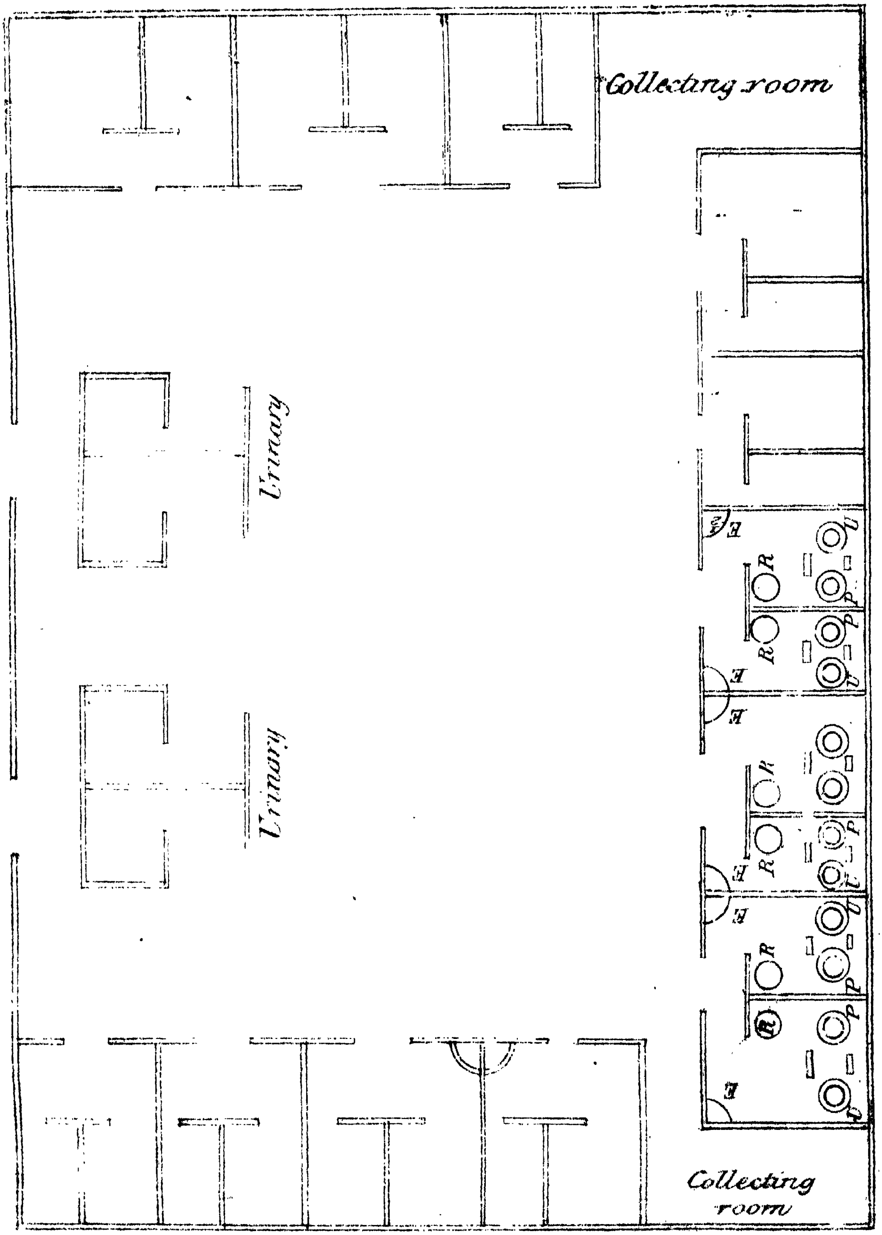
The drains are from two to three feet deep. They are kept tolerably clean, mainly by municipal authority.

These drains are cleaned out and repaired once every year, when the roads are under repair; they are never obstructed, but almost invariably overflow after a heavy shower.

No bad result occurs after the overflowing of these drains, as they contain no stagnant water, being quite dry, unless there is rain.

The place is not properly drained. In fact there is no system of drainage; and that is not possible with the present funds of the municipality. Well-privies are made use of in Bhaugulpore. There is one in every house, only the very poor, not being able to have one, resort to jungles. These well-privies are, on an average, twenty feet deep, and situated on the back part of the dwelling houses, often giving out an offensive smell. They are scarcely near the wells from which drinking water is obtained. When these privies are filled up, they are covered over with earth, and another is then dug near the same spot.'

" There are public latrines in Bhaugulpore, they are situated near crowded bazaars, and populous quarters of the town, there are a few near the Government Courts. They are on the dry-earth system,—managed by one municipal overseer, and they are kept tolerably clean.



R. Receptacle for ablution water.

E. Receptacle for earth.

P. Pan for fœces.

U. Pan for urine.

"The above is a rough sketch of the sort of latrines provided by the municipaltity for the town.

The private privies are all well-privies. The dry-earth system is not adopted in these.

The excrementitious matter is allowed to remain in these wells for years.

The excretions of sick persons are not disposed of with care.

The slaughtering places are very close to the dwelling houses of the people.

The chief nuisances in Bhaugulpore are, a government distillery (already alluded to), one tan-yard, and the manufacture of castor-oil. These are all objectionable.

Brick-making is carried on in the immediate vicinity of the town: sometimes inside of it, near the dwellings of the people; and especially in the jail, which is in the centre of the town.

The preparation of hides is a very common trade. It is conducted in a yard situated in the very heart of the city, and besides this it is carried on in the houses of the *Chumars*, almost in every quarter of the town. It is done by steeping the hides in vats, and then drying them in the sun—both these processes produce an offensive smell.

In certain places unpleasant odours are perceptible; these are from local causes—as well-privies, tanning operations, castor oil manufacture, &c."

Food is not properly cooked; some of the vegetables are sometimes eaten almost raw."

With regard to the circumstances of life, predisposing to disease, Dr. Wright mentions fasts enjoined both by the Mahomedan and Hindoo religions; early marriages; want of proper clothing, and certain religious festivals as the *Mohurrum* and *Nobanno.* In the latter they take a quantity of indigestible food; during the former they recklessly expose themselves "like mad people, in the hot sun, without observing any of the laws of health.'

UNWHOLESOME LIQUORS.

"Intemperance is common; *kaeths, dosadhs* and *kahars* invariably drink. There is no particular disease that might be said to have its origin in their intemperate habits, but the *kaeths* who drink excessively, are generally of weakly constitution, and short-lived."

"*Mowah* is the only liquor indulged in to a large extent, and it has much of the decomposing vegetable matter in solution."

SPECIFIC DISEASES.

"There is no doubt whatever but that fever is the commonest form of disease.

In the police hospital during 1868, there were 168 cases of fever out of 409. In the jail hospital 90 out of 229. In the dispensary only 492 out of 4,000, as the people of this place greatly prefer to treat fever cases at home.

These fever cases are usually slight, and if quinine is used, easily curable; out of 897 cases (in 5 years) admitted in the jail hospital, there have been only six deaths, and out of the 627 in the last four years, only two deaths.

There can be no doubt that the jail has greatly improved of late years, which I attribute mainly to the absence of overcrowding, to the increase of cleanliness, and to the introduction of dry-earth conservancy.

In 1855. There were 734 admissions into hospital and 179 deaths; average strength 520.

In 1868. The admissions were 229 and the deaths 6 only; average strength 303.

In 1855. The admissions from cholera were 199. The deaths 119.

In 1868. The admissions from cholera were three, and there was only one death.

In the five years 1864-68, there were in all 2,358 admissions, 160 deaths; average strength 326.

Of these admissions 126 were cholera cases; deaths 33.

Of fever cases 897 with 6 deaths.

Of diarrhœa 282 cases and 5 deaths.

Of dysentery 192 cases and 21 deaths.

So that in five years more than 63 per cent of the admissions were from these four diseases, and more than 40 per cent of the deaths."

" Hepatitis is very rare in this place, so far as I am able to speak. I have not seen ten cases in four years ; the Sub-Assistant Surgeon has seen about fifteen in dispensary practice. Small-pox is very rare in the jail, and when it does occur it does not spread. I think I have had five or six cases in four years; not one died, and in no instance was one case followed by another for a period far in excess of variolous incubation.

Out of 576 men examined in the jail, it appeared that 190 had hadsmall-pox; 375 had been inoculated, and three vaccinated; while eight were unprotected; these eight cases were vaccinated without loss of time.

There has been a small pretence of procuring reports of sickness in the district through the agency of the Police, but they are entirely untrustworthy.

A point of interest came out concerning these returns, which shows the difficulty of ensuring accuracy in such matters. It turned out that every kind of inflammatory disease, or generally anything which makes the body hot and raises the pulse is called "fever" so that three deaths attributed to fever, may really have been caused by acute rheumatism, pneumonia and enteritis.

The Sub-Assistant Surgeon, who visited some villages, recommended that the distribution of cholera medicines should be transferred from the Police to the *munduls* of villages, and I supported the recommendation, but nothing was done.

Cholera prevailed this year in October and November, instead of, as usual, in April and August. The April epidemic was entirely wanting in 1868."

EPIDEMICS.

" I have written many reports on cholera epidemics since I came to India; but the only conclusion I can now come to is, that I know very little indeed about it. The information we can gather on the subject is scanty and uncertain as well as extremely vague. I have no theory, and no faith in any one treatment more than another. I have tried everything that I have seen recommended by tolerable authority, and have no faith in any of them. The opinions I have formed on one occasion have been destroyed by the experience of another, and I have never yet seen a theory of any kind which seems, in face of my present experience, to be tenable.

The following extract from my annual return for 1866 expresses just about my present opinions, or rather the absence of any opinions.

Cholera occurred in four months during this year, as shown by the following daily statement" :—

"The first case occurred on 4th March which was a rainy day, with the thermometer at 68° and an easterly wind. Then no more till the 21st, when the wind was still easterly, but the weather was dry, and the heat was 82° in the shade. From then till 4th May, eleven cases occurred, the weather being hot and dry, and the wind sometimes east and sometimes west. Of the thirteen cases three proved fatal and ten recovered, and the disease seemed rather less virulent than usual. On the 5th of August, the day being cloudy, the wind easterly, and the heat 92° in the shade, a fatal case occurred, and between the 5th and 20th of August thirty-two cases were admitted, of which thirteen died and nineteen recovered. Of these, fifteen occurred from 11th to 14th when the wind was from the east. There was heavy rain on the 7th, 9th and 11th, and it had been a native superstition that the disease would disappear with the first rain, but no such result ensued.

Date.	Months.	Cases.	Deaths.
4th	March	1	0
21st	Ditto	1	0
22nd	Ditto	1	0
19th	April	1	1
20th	Ditto	1	0
23rd	Ditto	2	0
24th	Ditto	2	1
25th	Ditto	2	1
26th	Ditto	1	0
4th	May	1	0
5th	August	1	1
6th	Ditto	1	0
7th	Ditto	1	0
8th	Ditto	2	0
9th	Ditto	1	0
10th	Ditto	1	0
11th	Ditto	5	1
12th	Ditto	3	3
13th	Ditto	1	0
14th	Ditto	6	0
15th	Ditto	4	2
16th	Ditto	1	0
17th	Ditto	1	1
18th	Ditto	1	2
19th	Ditto	1	0
20th	Ditto	2	1
21st	Ditto	0	1
23rd	Ditto	0	1
	Total ...	45	16

The disease came and went, and was in its coming and in its going as mysterious as usual; no reason could be given for its advent, and when it had come there seemed no reason for its departure. The weather was cool (68°) and hot (92°), the wind blew east and west, the weather was at one time intensely dry, and in August ten inches of rain fell, in the fifteen days (5th to 20th.) I could see no relation between any of these conditions and the progress of the disease, nor can I say why people should die in one epidemic at the rate of 23 per cent, and in another, at the same place, at over 40 per cent. Old and young prisoners were equally attacked, strong and weak, labouring and non-labouring, long-term and short-term men; and, instead of dying out quietly like other epidemics, as having exhausted their virulence it stopped suddenly and the three last cases were all fatal; some died in six hours, others lasted four days. In some cases there was little difficulty in stopping the purging and vomiting, and yet the man would die. Men died in all stages of the disease, and sometimes when I fully expected they would recover; and several got well whose condition appeared to be perfectly hopeless.

As to treatment, all kinds were tried, and on the whole, I am disposed to think that frictions, and stimulants, with fomentations to the loins, with cloths wrung out of hot water, and then sprinkled with turpentine, did more good than any other. But indeed I am very doubtful if any treatment had any effect at all. The general impression left on my mind was, as it has often been before in similar cases, that some died and some got well, but that none were cured; and in this view, I rather favour the stimulating treatment, under an idea that it may perhaps help to keep a man alive until the disease works itself out. I have great doubts whether it is desirable to stop the evacuations when the cholera once sets in, and in the very worst and most fatal epidemic I ever saw, the almost entire absence of either sickness or purging was most remarkable. The men went straight into collapse of the profoundest kind, and as a rule, died in a very few hours. I take the part of a Doctor, in the treatment of cholera, to be very like that of a Ship-captain in a cyclone; he cannot quell the storm, nor hope to wrestle with it successfully, but he can keep the ship's head in the right direction—and this is about all *we* can do.

During the prevalence of cholera there was a general tendency to bowel complaints. In August while thirty-two cases of cholera occurred, there were also sixteen cases of dysentery and twelve of diarrhœa, or sixty cases out of a total of ninety-three. Inspections were regularly made, and a considerable number of cases of slight diarrhœa were treated, besides those who were admitted into hospital.

The jail was by no means crowded at the time of the outbreak, but 150 men were sent at once into camp at a distance, nearly 100 were put into the manufacturing sheds in the garden, and barely 100 prisoners were left in the jail. The whole place was white-washed and fumigated, and on the 2nd September the prisoners were all brought in again to the jail building, and no case has occurred since; while they were divided the admissions from the three parties was proportionally to numbers about equal, and I have no reason to believe that the cholera in any of them was more prevalent (even if it was as prevalent) than in the town, where the mortality was terrible, and where the disease lasted much longer than in the jail.

Cholera may be looked on fairly as an endemic disease in this town and district, as it occurs every year, and at all seasons of the year (in varying proportions.) In 1867 it commenced in the town, in April, and in the same month was only prevalent at Banka (28 miles to the south) ; in June it was reported as having caused great havoc at Kissengunge, which is thirty miles off on the north side of the Ganges; by the end of June it had reached Soopoul, seventy-four miles due north, and travelled along the edge of the Nepaul Terai. In July it reached Colgong which is twenty miles to the east of the station, and in the same month it was at Kummurgunge which is eighteen miles to the west of Bhaugulpore. It continued in the district till September. It was never quite absent from the station from April to September, though at times it was worse and at other times the cases and deaths were few. If we take it as having started from Bhaugulpore, (which is not proved, and apparently may be attributable to our knowing a little more about things in the station) it would seem that it went to the north and south, and then secondarily from north to east and from south to west, (the prevailing winds being always east and west.)

In the entire absence of a register of deaths, I think it would be a mere mockery to give any figures as representing the mortality from the disease. The Police say that only 336 persons died of it altogether, but I am quite sure that their estimate is absurdly low. I have seen at least twenty-five bodies on one morning *en route* to the *ghât* on the Ganges, and have seen in the Police report of the same day only one or two deaths reported. Many thousands of cholera pills were sent out for distribution, and it was reported that they were very useful. One Inspector reported that six out of ten recovered who used the pills; while in one village where they would take no medicine, there were forty-nine deaths out of sixty-one cases.

On the whole, I regret to say, that I cannot see anything whatever in the circumstances attending the outbreaks of cholera in Bhaugulpore, which would throw the smallest degree of fresh light on the feasible means for the prevention of the disease, or on the correct treatment of it. Perhaps after the epidemic which has prevailed lately among cattle in England and the experience which has been gained therefrom, but which led to no better result than an order for the indiscriminate slaughter of all beasts affected with it, more allowance will be made for the difficulties and honest doubts of those whose lot it is to treat cholera in its chosen home. I hope, especially, that a confession of ignorance will not be taken as an admission of stupidity. The same causes that originally generated the disease are still in full operation here, and the conservative character of Indian public opinion is a great and powerful security against their removal. I believe that it is almost as possible to diminish Indian heat, to change the course of the seasons, or to foretell the precise date of the advent of the millennium, as to change the apathy and prejudices of the natives of India,—to do away with cholera. To deal with cholera at all requires a promptness which no native shows in anything else—but in counting pice, and a truthfulness which few indeed possess. It is difficult here to find out even when cholera is [illegible]. I once asked two men from the same village, on the same day [illegible] or not. One, a Head Clerk in an Office, [illegible] village daily. The other, a Police

FAIRS.

"I know only of four, *viz.*, 1, Singhessur; 2, Bowsee; 3, Bararee; and 4, Champanuggur. No. 1 in February, 2 in January, 3 in February and No. 4 in September; Nos. 1 and 2 may have about 50,000 people; No. 3 about 10,000; and No. 4 about 3,000.

I do not consider these fairs to be in any appreciable degree a source of disease, and I see very many and serious difficulties in the way of meddling with them in any case."

VACCINATION AND INOCULATION.

"There is one vaccinator in the town who is paid by the Municipality. There are two native doctors at the sub-divisions, and the Civil and Sub-Assistant Surgeons at the sudder station. There is a very strong prejudice against vaccination in almost all parts of the district, and in five years only 1,519 operations have been performed, and of this small number the great majority has been among Europeans, Eurasians, Native Christians, and the more intelligent and educated Bengalees who have settled here. The mass of the people hold it in entire abhorrence, and popular prejudices probably are untouched. Is this to be wondered at? Did the English people take kindly to it, and to inoculation? Why we should expect the natives of this country to abandon inoculation and take to vaccination has always been a mystery to me. Indian public opinion is many centuries behind English opinion, and Indian prejuduces are many times stronger than English prejudices, and less than one century ago inoculation was a novelty in England and vaccination was unknown.

Inoculation is practised to a very great extent, but with a singular exception: it would seem that if a man has small-pox naturally, his children and grand-children are not inoculated, until some bold innovator has courage to break the spell, which ordinarily endures for many generations. I have illustrated my opinion before, by speculating what success a foreign conqueror would have had in England if he had signalised his conquest of the country by an edict that every male child should be circumcised instead of baptised, and yet our Government in India acts still more wildly *sic*; it passes no law, issues no command, uses none of its own lawful authority, but tells Civil Surgeons that they are to be held personally responsible for the diffusion of vaccination through their districts. They may be held responsible, but the spread of vaccination will be slow, for three reasons: *first*, the people refuse to accept it; *second*, Civil Surgeons have no power to make them accept it; and *third*, because well regulated inoculation has very nearly as little danger, and even greater protective power—

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certainly, at any rate, a more lasting power. At all events until a vaccinated vaccinator becomes common, I shall look for no succces, and of my own knowledge I am aware that the nephews and nieces of a late Principal Inspector General in the Indian Medical Service were all carefully inoculated. On the whole probably about seventy-five per cent of the people of this place are inoculated, and perhaps one in 1,000 has been vaccinated.''

QUARANTINE.

"I entirely disbelieve in the efficacy of sanitary cordons and of quarantine generally. I think such things are futile, delusive and annoying."

NATIVE PRACTITIONERS.

"I can give no estimate for the district. In the town it is believed that there are about thirty *boids*, three *kobirajes* and twelve or fourteen *hakeems*.

I have not personally seen much of these men, and have no particularly good opinion of them as far as I have seen. The Sub-Assistant Surgeon has of course seen more of them, and he considers them to be very timid practitioners, always trying to humour the patient and his friends, by declaring a thing to be injurious or beneficial according to their tastes and likings. They have no knowledge of their profession and know nothing of diagnosis. Their influence is decreasing, but the tendency of the native mind is rather to neglect native medicine than to try the English system. The female part of the community, as usual, is the last to leave an old superstition, and among women their influence is still very great. Their practice is almost entirely empirical. They make no pretence of reading books, or of learning their profession in any way. It is generally an inheritance and the practice of it illustrates the proverb—" If one kills 100 men he becomes a common kind of doctor, but when he has killed 1,000 he is a universally recognized practitioner.

(সত মারি ভবেৎ বৈদ্য ! সহশ্র মারি চিকিৎসক)

They always give mercury in syphilis, bitter febrifuges such as *golunchо* and *atees*, in fever, mercury for old ulcers, arsenic and aconite in cases of typhoid and remittent fever, occasionally iron in old cases of fever and diarrhœa. But broadly they consider all diseases as simply heat and cold, and treat them accordingly. They make no distinction for instance in treatment between fever and peritonitis. The Surgical Department is mainly in the hands of barbers; they apply blisters and issues, cauterise tumours, bleed, cup, and occasionally extract stones; one fatal case occurred some time ago, and the body and stone were sent in. The incision was almost median and considerably further forward than we cut.

Midwifery is quite in the hands of entirely uneducated women. The people are not surprised or put out at any mishap that occurs, and as nothing is usually done, the average of success is not very low. I saw a case here, in which a man came to ask the English Doctor for help, and, to show the need for his coming, brought the child's arm in a *jharun* and said the woman had been exactly in *statu quo* for three days.

There are great difficulties in the way of procuring native remedies of uniform quality and in good condition. If they are to be used "by authority" I think they should be issued by authority. In trying a new thing, I have no means of knowing if I have a good or a bad specimen to experiment with."

32.- MONGHYR.

THE REPORT IS BY DR. J. MACLEOD CAMERON, CIVIL SURGEON; IT RELATES TO THE MONGHYR MUNICIPALITY.

Monghyr.—*Latitude* 25°-19′ *North—Longitude* 86°-30′ *East.*

"Monghyr is situated on the right bank of the river Ganges, on rather irregular ground, varying from 120 to 150 feet above the level of the sea, from which it is distant, in a straight line, about 250 miles.

A healthy place. Formerly, it was loked upon as the sanitarium of Lower Bengal, and up to the present is a favorite resort of the wealthy natives of Calcutta.

I have not the means of contrasting its past and its present state. It still retains its ancient reputation for healthiness; the sickness and mortality within the jail has diminished within the last few years; the principal streets in the bazaar have been kept cleaner, and in some parts they have been widened; but I cannot state that there has been much real improvement.

No statistics of mortality or sickness can be furnished; within the last few months mortuary returns have been furnished by the Police, direct to the Commissioner; these I have not seen and can say nothing of them.

The past year has been one of the healthiest on record; there has been no exceptional mortality or sickness.

" Disease is more general from the onset of the rains to the beginning of the cold weather (December;) during the remainder of the year very little sickness occurs; the first of the following tables shows the daily average sickness to strength per 1,000, and mortality to average strength among prisoners for each month of the year. Column No. 1 contains the mean of the eight years—1860 to 1867 inclusive. No. 2, the same information for 1864, when no exceptional sickness occurred. No. 3 shows the remarkable modification occurring in an epidemic year, 1863. The second shows the number of cases treated, and the mortality in the Charity hospital, during the 1st and 2nd halves of each year from 1857 to 1866, inclusive. Both the tables show the great increase not only in sickness, but in the severity of disease, as evidenced by the great increase in mortality in the latter half of the year, compared with the first half. In 1863 cholera raged with great intensity during the 1st half of the year; so that the ordinary state of affairs was reversed, the 1st half of the year showing the greatest sickness. It will be observed, however, that there was no diminution of ordinary sickness during the 2nd half year, that amount being greater than the average of the corresponding half during the years 1860-67.

Statistics of the Monghyr Jail.

	No. 1.			No. 2.			No. 3.		
	1860 TO 1867.			1864. NON-EPIDEMIC YEAR.			1863. EPIDEMIC YEAR.		
MONTH.	Daily average sick.	Sickness to strength per 1000.	Mortality to average strength.	Daily average sick.	Sickness to strength per 1000.	Mortality to average strength.	Daily average sick.	Sickness to strength per 1000.	Mortality to average strength.
January ...	24·64	68·15	0·60	29·77	85·27	0·28	54·70	130·78	1·43
February ...	22·48	62·001	0·12	30·00	86·00	......	48·39	118·48	0·24
March ...	23·89	64·95	1·35	25·58	78·34	0·30	65·19	158·70	7·40
April ...	24·93	70·01	1·47	24·96	71·75	......	52·20	145·83	5·28
May ...	19·38	53·98	1·04	21·16	57·92	0·27	37·74	100·32	2·65
June ...	17·81	48·66	0:58	22·90	58-77	0·25	31·16	82·22	3·69
July ...	20·82	58·54	1·22	21·19	56·96	......	42·70	133·92	4·54
August ...	27·30	72·09	1·29	22·87	59·42	0·25	52·12	134:46	3·09
September ...	27·64	74·11	1·82	29·56	76·32	0·25	51·66	134·91	6·00
October ...	29·41	83·75	2·13	35·83	103·22	1·15	46·06	122·54	5·61
November ...	23-32	69·76	1·44	33·70	91·68	1·09	31·56	92·57	2·93
December ...	22·69	46-75	1·23	28·80	78·64	0·54	29·83	86·29	2·31

Half-yearly Dispensary Return.

Years.	January to June, cases treated.	Mortality.	July to December, cases treated.	Mortality.
1857	1,283	30	1,686	66
1858	1,830	35	1,742	50
1859	1,384	22	1,642	50
1860	1,579	23	1,467	16
1861	1,427	23	1,553	23
1862	1,464	26	2,312	40
1863	1,870	31	2,019	44
1864	1,320	13	1,511	24
1865	1,471	18	1,677	36
1866	1,282	17	1,644	58
Total	14,910	238	17,253	407

"We have no means, at present, of calculating the population of Monghyr. There is no registration of births or deaths. Mortuary returns have lately been obtained through the agency of the Police. Not having seen these, I have no remark to make regarding their trustworthiness.

The sub-soil water is found by digging to a depth of twenty feet. There are no canals in the neighbourhood of Monghyr.

The country around is higher than the river banks, though throughout the district, the immediate bank of the river is higher than the ground more inland.

Monghyr is situated considerably above the flood level of the Ganges; the course of the river varies much from year to year.

The natural slope of the country is such that no water lies on the ground.

There is no irrigation except by wells."

METEOROLOGY AT MONGHYR.

Table of Rain-fall for each month from 1858.

MONTHS.	1858.	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.
January	0·60	......	......	......	......	0·70	0·75	......	0·60	1·10	0·30
February	0·90	2·60	0·20	......	......	......	0·02	1·20	3·00	0·85	1·65
March	......	1·35	0·25	1·15	0·85	......	0·05	1·45	......	1·65	0·58
April	......	1·60	0·20	0·35	0·40	0·90	......	1·40	1·20	0·70	......
May	1·20	1·50	0·40	4·80	0·95	0·65	0·80	5·30	......	2·70	1·63
June	4·70	17·00	2·15	5·55	9·20	3·55	2·50	3·75	6·50	13·07	3·13
July	6·00	8·85	10·28	15·90	8·00	6·95	24·60	15·05	5·20	6·62	8·61
August	17·40	11·30	6·28	3·05	9·80	10·90	7·60	5·86	10·10	8·15	12·67
September	10·00	8·90	6·80	11·75	4·15	14·80	5·10	1·80	13·55	5·25	3·31
October	7·00	13·15	0·30	17·15	7·10	2·00	0·50	......	5·40	3·40	0·02
November	......	......	......	0·30	......	0·40	......	......	......	......	......
December	......	0·20	......	0·15	......	......	......	1·00	......	......	0·40
Total	47·80	66·45	26·86	60·15	40·45	40·85	41·92	36·81	45·55	43·49	32·30

Average annual fall 43·85.

Table of Height of Thermometer in sun's rays at 4 P. M., at Monghyr.

MONTHS	1858.			1859.			1860.			1861.			1862.			1863.			1864.			1865.			1866.		
	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.
January	90	89·5	8	99	93	87	98	89·5	81	85	79	73	86	84	78	86	80·5	75	81	77·5	74	97	88·5	80	110	102·5	95
February	101	96	91	101	93·5	86	107	99	91	98	88·5	79	102	91·5	81	103	93·5	84	89	83·5	78	105	100	95	115	109·5	104
March	107	102·5	98	111	101	91	119	107	95	112	96·5	81	105	100	95	109	104	99	101	91·5	82	107	99·5	92	115	108·5	102
April	112	102	97	112	106·5	101	123	112	101	109	105·5	102	106	98	90	111	101	91	107	103	99	109	102	96	112	111	110
May	118	109·5	101	118	113·5	109	120	111	102	111	103	95	115	102·5	90	126	111	96	109	104	99	111	102	93	110	109	108
June	121	114·5	108	112	105	98	121	115·5	110	109	98·5	88	111	104·5	98	128	112·5	97	109	104·5	100	108	100·5	93	107	103·5	108
July	110	107·5	105	114	109·5	105	103	100	97	98	94	90	104	101	98	105	102·5	99	109	99	89	104	97	90	85	84·5	84
August	111	107	103	110	104	98	106	101	98	101	96	91	...	...	...	104	100·5	97	103	99·5	96	102	96	90	95	89·5	84
September...	112	106·5	101	112	107	102	106	95·5	85	107	102·5	98	115	107	99	105	101	97	105	99·5	96	110	99·5	89	111	103	95
October	109	103·5	98	111	106	101	105	96·5	88	102	98·5	95	106	101	96	102	96·5	91	97	93·5	90	96	91	86	112	102·5	93
November...	104	97·5	91	105	96	87	110	95·5	81	102	86	90	99	95·5	92	95	88·5	82	91	87·5	84	85	79	69	90	87	84
December	91	89	87	93	87	81	85	80	75	88	84·5	81	94	92·5	91	83	79	75	87	83·5	80	110	97·5	85	85	84·5	84
Mean of each year	107	102	97	108	102	95	109	100	92	102	94	89	104	98	92	105	96	90	99	94	89	104	96	88	104	100	96

Table showing Height of Thermometer in the shade, at Monghyr.

MONTHS.	1858.			1859.			1860.			1861.			1862.			1863.			1864.			1865.			1866.			1867.			Mean of each month.		
	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.	Maximum.	Medium.	Minimum.
January ...	70	63·5	57	74	66·5	59	79	65·5	52	73	64	55	70	62·5	55	73	65	57	73	64	55	89	78·5	68	95	82·5	70	84	69·5	55	78	68	58
February ...	78	68	58	78	69·5	61	88	74·5	61	83	71	59	82	70	58	82	71·5	61	75	62·5	58	96	86·5	77	99	88	77	95	80	65	86	74	63
March ...	98	78·5	67	87	76	65	98	83	68	91	78·5	62	88	76	64	95	82·5	70	88	71·5	61	92	89	86	28	90	82	95	80	65	92	80	69
April ...	98	88	78	94	82·5	71	106	90	74	96	87	78	95	84	73	94	82·5	71	96	85·5	75	98	91	84	88	85	82	98	86·5	85	96	86	76
May ...	102	90·5	79	96	85·5	75	109	95·5	76	99	89·5	80	100	86	72	101	87	73	95	86·5	78	97	90	85	88	85·5	83	99	86·5	74	90	88	77
June ...	103	91·5	80	94	86	78	105	91	77	91	85·5	80	100	89	79	102	91·5	81	97	90	83	90	86	82	87	85·5	84	99	89	79	97	88	90
July ...	92	85	78	93	86	79	99	90	81	90	85	80	90	86	82	96	88·5	81	94	87·5	81	83	85·5	83	75	64·5	54	89	84·5	80	91	84	78
August ...	87	83	79	87	82·5	78	95	86·5	78	90	85	80	90	86·5	81	91	85·5	80	90	85·5	81	88	86	84	84	...	55	84	81·5	79	89	83	77
September ...	90	85·5	77	88	84	80	94	85	76	89	84·5	80	93	86	80	90	84	78	89	70·5	70	87	76	65	95	80	65	88	84·5	81	90	82	73
October ...	86	76	66	84	78·5	73	86	79	72	85	80	75	90	81	73	87	80·5	74	87	80·5	74	67	64	61	81	74·5	68	85	77	69	84	77	70
November ...	79	71·5	64	85	70·5	60	80	71	62	81	71·5	62	80	73	66	81	72	64	75	68	61	74	60	38	73	62·5	52	83	73·5	64	79	69	61
December ...	74	65·5	57	75	64·5	54	71	64	57	71	65	60	72	63	55	71	65	59	74	66·5	59	83	76	64	75	64·5	34	70	62	54	74	66	57
	87	79	70	86	78	69	92	81	69	87	79	71	89	78	70	89	80	71	86	77	70	88	81	76	86	78	69	89	79	69	...	...	...

	Maximum.	Medium.	Minimum.
Mean for the entire period ...	88°	79°	70°

"The observations given in the preceding tables were taken at the jail, by the Native Doctor in charge. The past season has differred from ordinary seasons in two particulars. In the first there can scarcely be said to have been any regular hot weather, except for a short time during the month of April. Rain fell early in May, and although the quantity was great, yet when the sky was not overcast, heavy clouds kept off the direct rays of the sun. In May and June the amount of sickness was above the average. In the second place, while the rain-fall in July and August was considerably under the average, there was only a slight fall in September, and none in October and November. These months were therefore much drier than usual, and much less sickness prevailed than is usually the case.

In Monghyr the hot season extends from March 1st to June 1st; the rains from June 1st to November 1st; the cold season from November 1st to March 1st.

In February the nights are still cold, but the days become progressively warmer. At this time rheumatism and dysentery are apt to occur among the poorly clad, from exposure. Whooping-cough and measles prevail at this time in an epidemic form. March, April and May are the three healthiest months in the year, as a rule. The people do not suffer from the heat; exposure during the night leads to no evil results. Cholera, however, makes its appearance at this time, and by its ravages may cause a greater mortality than at any season of the year.

Thunder-storms occur during the latter part of May and beginning of June. These sometimes continue till the end of June, the regular rains not setting in till July. These storms do not affect the public health injuriously. The appearance of the rains ushers in the unhealthy season. Intermittent fever, dysentery, diarrhœa and inflammations of the chest become more prevalent, and the latter two diseases less amenable to treatment. The Dispensary Returns, between 1857 and 1866 inclusive, show that while 238 deaths occurred during the first half of all those years, 407 deaths occurred during latter six months.

Towards the end of October and beginning of November the thermometer sinks considerably, and the cold weather approaches. The changes of temperature are both great and sudden. An east wind renders the day hot, moist and close; a west wind, blows hot and dry during the day, but chilly at night. Catarrh and inflammations of the lungs prevail, and those who have suffered much from intermittent fever during the rains are apt to have returns of it."

"In November and December the weather is cool and pleasant. Few fresh cases of sickness occur; catarrh and inflammations cease to appear, and those who have been suffering from intermittent fever and dysentery gradually recover strength, if protected against undue exposure.

Water is found at a depth of 20 feet. Tanks are not used for irrigation purposes.

The crops during the past season have been considerably under the average. The rice crop was an entire failure from want of water."

SANITATION, CONSERVANCY.

"The main streets of Monghyr are kept clean, but otherwise it is much the same as it must ever have been. As soon as you leave the main streets you come across heaps of putrefying filth and large holes full of feted fluids. Drainage is imperfect; partly because it is incomplete, partly because the levels of the drains are not correct. The larger drains running in front of the houses are, as a rule, built over, only a small hole being left in the verandah, through which the filth is poured into what is thus converted into a cess-pool.

None of the Municipal Bye-Laws are enforced.

Some roads have been widened; a few drains have been cleared and put in order; bridges improved, and two public necessaries erected.

To diminish sickness in the town I would suggest that the system of drainage be completed; that the masonry covering the road-side drains be removed, and these drains be, to a great extent if not altogther, filled up; that the heaps of filth be removed; that more public necessaries be constructed; that the immense cavities existing in various parts of the town be either filled up or deepened, so as to form tanks, and generally that the Municipal Bye-Laws be enforced.

(a) Monghyr cannot be considered a malarious place, although intermittent fever is common enough. Its situation is good.

There are, however, in several parts of the town, hollows of great extent and of irregular shape and depth."

At one of these (Lulloo Pokur) brick-making is now being actively carried on. The description of one of these (Groica Pokur) will suffice for all. Leaving the fort by the east gate, we enter the Burra bazaar, and proceed, on a gradual descent, for several hundred yards; then turning to the left we enter a narrow lane about three feet wide. Passing through this we come upon an open space of some extent in which the *Pokur* is situated. It is completely surrounded by houses. The hollow is of irregular shape, and is of about 100 yards in length and breadth, and is partially filled with black muddy water, the accumulation of all the surface drainage of the neighbourhood. Numbers of people are bathing and washing clothes, while the portion of the hollow not now under water is being used as a public necessary. Later in the season the water dries up, and only a fœtid black mud is left. In the hot weather it is perfectly dry.

River water.—" This during the rains is muddy, but it is otherwise good, and much valued by natives. The mud settles on standing, leaving the water clear and of a pleasant taste. Towards the end of the cold weather, however, the current ceases, and as thousands of people wash themselves and their clothes at the same *ghât* whence the drinking water is taken, it gradually deteriorates, and I have observed it in some places to be almost putrid. Last year an attempt was made to remedy this by removing the washermen some distance from the drinking *ghâts.*

Wells.—There are about thirty *pucka* and upwards of 2,000 *kutcha* wells."

The *pucka* wells are generally placed on the road-side in the more crowded parts of the town. They vary in width; the larger ones are grated, the smaller ones open; all are surrounded by walls varying in height from six inches to three feet. They vary in depth from 20 to 50 feet. The average depth of water from the surface is 22 feet; but this varies with the position of the well, for example, one has a depth of forty feet with twenty-five feet of water, another is thirty-three feet deep with eight feet of water."

There are no special measures taken to preserve the purity of the water, the large wells are grated; all are cleaned out in the hot weather. They are in constant use, and the water is thereby kept pure.

Some are well situated; others however, cannot fail to become contaminated, as the following description will show: Proceeding one morning to inspect the public necessary at Purranee Serai I reached a portion of the narrow lane leading to it, which was flooded with sewage. Turning off the path to observe whence it came, I found myself close to a well. In front of the well, about four feet from it, was a wall with three doors; the drain in front of each was filled up with broken bricks and ashes so as to divide the drain into segments, each of which was filled with sewage issuing from a separate privy. It was only the sewage of the lowest of these privies which found its way into the lane below. That of the higher ones could only escape from the improvised open cess-pools, by the evaporation of the fluid, or its filtration into the well below. Close to the other side of the well, were the ruins of an old house in which was a pile of human and other excrement about six feet high.

Tanks.—There is only one proper tank in the town, and three within the fort. The water is not used for drinking purposes; no water from marshes ponds, ditches or puddles is used.

(*d.*) *Drains, &c.*—There is no complete system of drainage in Monghyr. Two large ditches run from the fort eastwards, through the town, at the lowest level; they are met by cross ditches, which conveys the sewage northward, towards the river. As the last ditch is perfectly level, it is only in the heaviest rains that the sewage can be carried to the river; as a rule it stagnates in the neighbourhood of the town.

In the large streets there are drains on either side of the road, obstructed and rendered useless in the manner I have already described. The smaller roads and passages are themselves drains; a large portion of the sewage, especially in the rains, finds its way into these larger drains, much of it, however, finds its way into the large excavations already mentioned; much of it dries up where it falls, and in the rains the want of proper levels in the drains leads to large accumulations in various parts of the town.

Some cess-pits exist, but not in the more public parts of the town. There is a hole in the wall through which the sewage flows into a hole dug in the ground. This is never emptied; the sewage dries in it; when the hole becomes shallow, it is again dug out.

There are two public latrines under the management of the Municipal Commission. They are situated in crowded parts of the town, and are in constant use.

They are very useful, but quite inadequate for the purposes of such a populous town as Monghyr. Twenty public necessaries would not be too many.

The dry-earth system of conservancy is supposed to be in use, but it is only imperfectly carried out.

The refuse removed by the Municipal carts is thrown into hollows in the neighbourhood of the town.

The conservancy system is remarkable for its simplicity alone. The Municipality is the possessor of six carts, to draw which they likewise possess four bullocks. The inhabitants place at an early hour, on the road side, whatever refuse they wish removed; shortly afterwards the carts are brought round and are filled with it. They are emptied either in the fort ditch, or at the *Serai-ka-baree* near the town."

"The whole country is covered with Mahomedan burial places, and even within the town they are numerous. A year ago burial within the town was forbidden, and the Police have been instructed to see that this order is not transgressed. I believe, however, that the rule is not always complied with. The graves are five feet deep.

(*g*.) Last year a piece of ground was purchased, on which it was proposed to erect slaughter houses. This has not been done; animals are as a rule taken by butchers to be killed there. There is no doubt, however, that animals are sometimes killed by them within the town.

(*h*.) There are not many noxious trades in Monghyr. Jute steeping is not carried on. One store for hides, the proprietor of which was in the habit of spreading them in the sun to dry, has been closed. Brick-making has been to a great extent stopped.

(*i*) The general atmosphere is not tainted, although in certain places odours are plainly perceptible. The neighbourhood of stagnant sewage, of heaps of excreta, and the *kutcha* tanks already described are the principal spots.

A large proportion of the people indulge in intoxicating liquors. Opium eating and smoking *mudduck*, (a preparation of opium) is very common among the higher classes. The *mudduck* shops are frequented at night by many respectable people."

SPECIFIC DISEASES.

" I regret to state that under this head the information I have to give is extremely limited. In 1866, the then Collector, at my request, called for reports of epidemic diseases occurring in the districts, and I obtained them regularly for some time. I was then enabled to keep a steady supply of medicines at each *thannah* and out-post; and soon the people learned to apply to the Police on the first appearence of epidemic diseases.

In 1867, however, the Bengal Government ordered this return to be made officially to the Magistrate; and since then I have ceased to see it. I have also been told that mortuary returns are sent in by the Police direct to the Commissioners, but of this I know nothing certain.

I would suggest that in future all returns of sickness, mortality, and cattle disease, should be transmitted through the Civil Surgeon for his information, and for any remarks he may think it necessary to make. Less than this surely cannot be done if we are expected to report on these matters.

My sources of information, therefore, are confined to the jail hospital and government dispensary, and it must be evident that from them no information is to be obtained regarding the spread or even the existence of epidemic disease in the district. In my own experience I have never yet known cholera to exist in the jail while it was prevalent in the native town. In regard to the dispensary, the very few cases treated there give no clue whatever to the extent of epidemic disease in the town.

Fevers.—Remittent and continued fevers are of very rare occurrence.

Cholera—Prevails to some extent every year in the town and district.

It generally makes its appearance about the end of March, is common during April, and disappears in May. In the years in which it has assumed a severe epidemic form it has continued till July or even later. In the jail it does not prevail at the time that it is common in the native town. In 1866 and 1867 cholera appeared in the native town in April, while in the jail it did not appear till July and August. In 1868 it appeared in April, but did not appear in the jail at all.

Small-pox—Has not prevailed in an epidemic form for several years, and its occasional appearence in the sporadic form seems due to the action of inoculations. In April 1865 it appeared in Monghyr and caused considerable mortality, but there are no data to be had regarding this outbreak.

Hepatitis.—Seldom comes under my cognizance.

Chicken-pox and measles often accompanied by whooping-cough are of common occurrence, but being confounded, by those whose duty it is to report epidemic disease, with small-pox, are not separately recorded. Whooping-cough continues throughout the hot weather.

Diarrhœa aud dysentery are common throughout the year. In the first half of the year, however, they are more amenable to treatment, except during the prevalence of cholera. From the commencement of the rains these. diseases become much more frequent and less tractable under treatment Next to cholera they give rise to the greatest mortality. The very great mortality amongst the in-door patients of the Government dispensary is due to those diseases. The poorer inhabitants of Monghyr suffer much in the rains from want of proper clothing and shelter, and many are picked up moribund by the Police and brought to the hospital to die."

STATISTICS.

" I have no statistics from which it would be possible to form a trustworthy guide to the amount or even to the nature of disease prevalent during the year. The following statistics are taken from the records of the jail and dispensary: "

Jail Return.

Diseases.	1864.						1865.						1866.						1867.						1868.					
	Cholera.		Dysentery and Diarrhœa.		Fever.		Cholera.		Dysentery and Diarrhœa.		Fever.		Cholera.		Dysentery and Diarrhœa.		Fever.		Cholera.		Dysentery and Diarrhœa.		Fever.		Cholera.		Dysentery and Diarrhœa.		Fever.	
Month.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
January ...	...	...	23	1	11	...	...	...	16	...	29	...	...	...	3	1	5	...	...	...	3	...	9	...	...	...	7	1	2	...
February ...	...	...	20	...	9	...	...	...	3	...	19	...	1	...	2	...	8	...	...	...	4	...	7	...	...	...	4	...	7	...
March ...	...	...	11	1	18	...	...	...	14	...	28	...	1	...	5	...	7	...	...	...	3	1	7	...	1	...	5	1	10	...
April... ...	1	...	9	...	16	...	...	...	19	1	25	...	...	...	16	...	10	...	2	...	9	...	5	...	...	...	6	...	13	1
May	...	...	11	...	25	1	...	...	19	...	8	...	1	...	27	...	30	...	1	...	11	...	5	...	1	...	5	...	10	...
June	...	...	11	...	22	...	...	...	13	...	15	...	...	...	10	...	20	...	...	...	11	...	4	...	1	...	11	...	8	...
July	...	...	21	...	14	...	...	...	10	...	8	...	...	...	30	1	33	...	24	8	13	...	7	...	...	...	10	3	12	...
August ...	...	...	30	...	32	...	...	...	22	1	15	...	11	6	73	4	49	1	...	...	37	1	11	...	...	...	4	...	10	...
September ...	...	...	28	...	41	1	4	2	38	1	22	...	...	...	33	8	32	...	..	...	19	1	12	2	...	...	15	1	14	1
October ...	...	...	36	3	33	...	1	...	30	3	21	1	...	...	18	1	33	1	...	...	12	2	13	1	...	...	4	...	5	1
November ...	...	...	20	4	32	...	8	4	24	2	7	...	...	...	6	2	24	1	...	...	13	3	7	...	...	...	1	...	1	...
December ...	...	...	9	2	22	...	...	...	10	1	7	...	...	...	3	...	12	...	...	...	14	2	5	...	...	...	3	...	4	...

Dispensary Return.

		Cholera.		Dysentery and Diarrhœa.		Fever.	
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
1863 ...	January to June	10	6	17	12	8	5
	July to December	9	4	30	23	11	2
1864 ...	January to June	1	...	7	4	10	1
	July to December	1	...	13	12	3	1
1865 ...	January to June	3	2	10	5	1	...
	July to December	8	4	31	21	13	3
1866 ...	January to June	7	1	11	8	2	1
	July to December	6	3	45	28	12	4
1867 ...	January to June	4	1	21	10	6	1
	July to December	8	3	36	15	16	4
1868 ...	January to June	8	4	28	21	4	1
	July to December	2	1	41	30	9	1
	Total	67	29	290	189	95	24

FAIRS.

"Fairs are held in the neighbourhood of Monghyr, though not within the limits of the Municipality.

At the Seetakhoond hotspring about four miles from Monghyr, fairs are held in November, January and March. The average number attending them is 12,000; they only last for a day or two, and I have never known of any outbreak of disease arising therefrom.

At Resakhoond hotspring, about ten miles south of Monghyr, a fair is held once in three years. It is of no great importance; seldom more than 2,000 people are present."

"Although not strictly coming under the definition of the word "fair," I must here mention an assemblage of the people of the district, which takes place annually towards the end of April. Thirty thousand *ryots* are called together at this time from all parts of the district, to deliver up their opium to the Government Agent, and to receive the balance of cash due to them, and as this is the only occasion they have of leaving their own part of the district, they take advantage of the opportunity to purchase cloth, brass and earthen vessels, &c., and many hundreds of tradesmen attend in order to supply these articles. Formerly all the *ryots* were summoned for the first day of the opium weighment, and for about a fortnight they remained crowded together, within a very small compass. Outbreaks of disease were therefore common, and in 1863, cholera caused great destruction of life. Under the arrangements made by the present Sub-Deputy Opium Agent, only that number of men are summoned for each day whose opium can be weighed, and to whom the money due can be paid within the working hours of the day. The men arrive, at earliest, on the previous evening, but continue to arrive all night; during the following day the opium is taken, the money paid, and by sunset all are free to return to their homes. As a rule, however, the evening is spent in making purchases, and on the following morning they depart. The number of men present at any one time is therefore reduced to a minimum, and the risk of an outbreak is proportionally lessened."

VACCINATION, &c.

"Vaccination is at present carried on by vaccinators paid partly by Government and partly by the Municipalities of Monghyr and Jamalpore.

Until 1867, vaccination was confined to Monghyr and Jamalpore with the surrounding villages. In that year the appointment of special vaccinators for the Municipalities enabled me to send the Government vaccinators into the district. Their success, however, has been very small, and I now think that it would be better to concentrate the efforts of the men within a limit of six miles round Monghyr and Jamalpore.

Inoculators should be encouraged to continue their operations as usual, but substituting vaccine lymph for small-pox matter. I have already made some progess in this matter, but until the end of the working season I shall be unable to report any definite success."

"Inoculation is universally practised; there are very few persons in the district who are not either inoculated or marked with small-pox; of 726 prisoners admitted into the Monghyr Jail during 1867 there were:—

Inoculated alone	421
Inoculated and marked by small-pox ..	35
Small-pox alone	199
Vaccinated	38
Without marks	33
Total	726

The following Table shows the number vaccinated in each month of the year since 1858.

Months.	1858.	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.
January ...	116	90	98	78	101	78	52	55	57	199
February ...	208	96	81	86	99	85	72	106	71	272
March ...	116	98	58	64	78	57	81	62	56	316
April ...	84	106	44	51	57	56	61	36	52	111
May ...	94	92	...	...	49	26	50	...	...	...
June ...	101	92	...	...	26	...	...	...	...	...
July ...	81	109	...	...	...	...	...	...	...	...
August ...	88	93	...	...	...	...	...	...	...	...
September ...	107	75	...	...	...	...	...	...	...	...
October ...	94	72	...	...	...	...	...	...	...	...
November ...	86	76	31	23	28	22	22	14	35	60
December ...	77	93	42	68	48	38	40	41	110	245
Total ...	1,152	1,090	354	370	486	362	378	314	407	1,203

"I have no reason to believe that the people are less inclined to inoculation than formerly, or that it is less commonly practised. The inoculators are beginning to doubt the legality of their proceedings, and would be glad to accept employment as vaccinators. Seventeen men are now in the district performing the old operation above the wrist with needles, using vaccine lymph instead of small-pox matter.

One of these informed me that the epidemic in Monghyr, in 1865 was, if not originated, at least intensified by the action of the inoculators, and that he himself was so frightened at the mortality consequent on the operation that he gave up its performance.

Complete cessation of intercourse between two neighbouring masses of people could not be enforced, and if attempted, would only cause much suffering.

In regard to the application of quarantine to jails, barracks, &c., the case is reversed. It could be made effectual without great expense, without difficulty, and without causing suffering, and, while most unlikely to cause injury, it might prove beneficial. For example, in 1867 cholera seemed to be introduced into the Monghyr Jail by a prisoner who was brought from a distant part of the district, in which cholera was prevalent, there being no cholera in the town of Monghyr, or its neighbourhood. He was received in apparently good health, and was attacked on the following day. Here it is probable that had a system of quarantine been in force, the jail would have been spared the outbreak, and half the mortality of the year averted."

To ensure absolute separation, however, something more is necessary than the simple intervention of a wall with a closed door between the healthy and the sick. It is requisite that the building to be protected, should itself be at a considerable distance from other houses, for cholera spreads otherwise than by the direct contact of human beings. In this station are two dwellings, the out-houses of which are within a few yards of the jail wall. When cholera was at its height in the jail, one man was attacked in the out-houses of each compound, cholera not existing, at the time within many miles of Monghyr, and there being no communication whatever between the prisoners and the inhabitants of these houses. It follows also that for the purposes of quarantine it is not sufficient that a ward in the jail, or even a separate house close to the jail, should be set apart; a hut must be constructed at a considerable distance from the building to be protected."

Doctor Macleod Cameron has furnished a careful list of indigenous drugs used in the Monghyr Dispensary, which, from want of space, I am obliged to omit.

33.—GYA.

THE REPORT IS FROM DR. CHARLES MARTIN RUSSELL, CIVIL SURGEON :—

Gya. *Latitude* 24° 46′ 13″ *North. Longitude* 84° 58′ 45″ *East.*

Healthy.

" I have not noticed any material change in the present and past condition of Gya in a sanitary point of view, during the last four years; *i. e.*, during the time I have resided here. The streets of the new town, Sahibgunj, are wide and very clean, and comparatively free from obnoxious smells: while those of the old town, Gya-jee, are exceedingly narrow, the houses closely packed together, and the general atmosphere, from the dirty habits of the Gyawals often offensive.

The *Gya sore*, commences as a cluster of small vesicles, which coalesce and form a large one, this then ruptures and leaves an ulcerated surface, tiresome to heal. (*b.*) Neuralgic headache, generally in the form of hemicrania, very intense.

Leprosy in all its phases, is common, especially the ulcerative and anæsthetic varieties. Scrotal elephantiasis is common, and in a good many instances, the leg is affected. (Barbadoes leg.) Gôitre and stone cases comparatively rare. Hydrocele frequent.

No exceptional sickness during the past year.

Between the breaking up of the rains and commencement of the cold weather, fevers and pulmonary affections are apt to prevail, and are due, I believe, to the chilly mornings; and from the middle of February, till about the 10th of March, the same diseases obtain, and are likewise due to changes of temperature, when the days are hot and the early mornings cold.

Average strength of police in the Gya District			..	1,000
Daily average sick of	..	Ditto	..	5·77
Deaths amongst	..	Ditto	in 1869	2
Rate per cent of deaths to strength		..	..	·2

Daily average strength of prisoners in Gya Jail			..	360·035
Daily average sick	Ditto	Ditto	..	8·05
Deaths amongst	Ditto in 1868		..	17
Rate per cent of deaths to strength		..	..	4·72

"Of these deaths amongst the prisoners no less than nine occurred in old subjects (two of whom were *hajut* prisoners) whose ages ranged from fifty to seventy-five years, the sum total of their ages numbering 540 years: thus giving an average of sixty years to each.

The poorer classes are more subject to bowel complaints, the result of coarse and indifferent food, while the richer classes are more prone to venereal disease. With the exception of the *Brahmins, Rajpoots* and *Gyawals,* who do not drink, the poorer members of other castes, who have to work hard for their living, are subject to disease of the brain, liver and kidneys, from over-indulgence in spirituous liquors and exposure to the sun. Cases of ascites especially, from cirrhosis of the liver, are frequent amongst the *Goalas* also amongst the *Domes, Kahars* and *Dosadhs.*

The people generally look healthy, are able-bodied, fit for work industrious and thrifty.

The place remains much in the same state as formerly, as regards the health of its inhabitants: the past year, however, has been a particularly healthy one. But as disease is more or less cyclical in its visitations, it is unlikely the health scale should advance in an increasing ratio, so to speak, without interruption.

The present population of the district is, in round numbers, about a million and a half. There are no data on which to specify the number of men, women and children. The estimate given is an approximate one only, and is obtained by taking the number of houses returned by the Police in 1865, and allowing six inhabitants for each house, and a slight increase for the last three years.

The incidence of the population to the square mile is about 274.

The extent of slope or fall, favouring natural drainage, is about six feet per mile from about thirty miles south of Gya, to twenty miles north; thence to the Ganges two feet per mile. The sub-soil water is usually found at about twenty feet from the surface, but its depth varies according to the locality and season of the year. About Nowada and Girriack it lies near the surface, often as near as four or five feet. At Sherghotty from twelve to fifteen feet."

Of the Soane, Dr. Russell writes as follows:

"It is said to be the best drinking water of any river, and a residence near its banks is considered a kind of sanitarium by the natives, (*sic.*)

" To the south of Gya, the banks of these rivers (the Soane and the Phalgu) are generally lower than the level of the surrounding country, while to the north of Gya they are higher.

There are no canals in the district.

The general level of the Gya district is higher than the flood-levels of the Phalgu, Morhur and Poon-Poon rivers, as far as twenty miles north of the sudder station; thence to the Ganges it is from two feet to four feet lower than the flood-levels of these rivers.

That portion of the country which lies between a point eighteen miles north of Gya to the Ganges, is occasionally totally submerged, in high floods, to a depth of from two to four feet. This may happen in the months of July and August. The average annual floods only slightly submerge parts of the country."

Regarding the storing of water Dr. Russell writes:

" Sometimes recourse is had to *Pynes* in which the water is stocked, and made to flow by channels leading from the rivers, and the rain water is received into reservoirs called *Ahurs.*

The average rain-fall in the Gya district is proverbially small, and averages from thirty-two to thirty-five inches only in the year. In 1867 it was far above the average, viz., 61·08 inches, but that was a most unusual occurence, and will probably not happen again for years.

The natural drainage of the country is not interfered with by the present condition or position of rivers, embankments or roads.

At Gya-jee (the old town of Gya, in contra-distinction to Sahibgunge the new town,) is the famous temple of *Vishnupod* overlooking the river Phalgu, which is considered a holy stream, and thousands of pilgrims (100,000 to 200,000) come annually from all parts of India to do *pinda,* in atonement for the sins of their fore-fathers." The new town of Sahibgunge is particularly clean for a native town, with very wide streets, and a large market place. The houses are made of *kutcha* or *pucca* bricks, or mud. The combined population of the old and new towns is about 71,580. Gya is situated fifty-five miles south of Patna and 265 north-west of Calcutta.

There are neither marshes, swamps nor low lying ground, &c., in the vicinity of Gya, which by their proximity might prove sources of disease. There are, however, one or two tanks about the town which are not, in my opinion, kept sufficiently clean."

METEOROLOGY, CLIMATE, &c.

The meteorological observations have been confined as yet to thermometric readings, and to the registration of the amount of rain-fall. An Observatory is in course of construction, and when completed, observations will be kept on a larger scale. The observations for the past year are shown in the subjoined tabular form. Those for previous years have already been rendered in former reports.

Year 1868.	TEMPERATURE.					RAIN.		REMARKS.
	Highest in month.	Lowest in month.	Mean of all highest.	Mean of all lowest.	Approximate mean.	Number of days it fell.	Amount collected in inches.	
	°	°	°	°	°			
January ...	74	52	69·9	56·55	63·22	One ...	·5	
February ...	83	54	76·27	66·89	68·58	....	....	
March	96	67	88·06	70·41	79·23	....	....	Occasional light showers.
April	104	76	97·46	80·76	89·11	....	....	
May	106	77	100·16	83·09	91·62	....	....	
June	102	78	94·43	84·2	89·31	Eight ...	6·62	
July	105	81	94·64	85·26	89·95	Ten ...	7·57	
August	97	81	91·06	83·06	87·7	Six ...	6·18	
September ...	98	79	92·33	82·26	87·29	Twelve...	6·54	Saved a good portion of *kureef* crops.
October... ...	94	67	90·61	74·48	82·54	....	....	
November ...	87	61	82·63	65·23	73·92	....	....	
December ...	78	53	75	57·25	66·11	....	....	

These observations were taken by myself at my house and the jail-hospital.
Total rain-fall for the year 27·41 inches.

The peculiarity of the past season consists in the small amount of rainfall, which was below the average.

The climate of Gya is dry, and from the middle of March till 14th June, very hot and trying. During the day-time the hot winds play, and the houses can be kept cool with *tatties,* but at night the wind lulls or dies away altogether, and then *tatties* are useless, and the hills radiate the heat they absorb during the day; hence, it is impossible to sleep till towards the early morning. The cold weather and the rains are delightful. The climate is of advantage to those who suffer from asthma.

IRRIGATION, CROPS, WELLS, &c.

"About five-eighths of the land are irrigated and cultivated.

Water is obtained for irrigation purposes by means of *pynes, ahurs* and wells. It is raised from the wells by means of *lotahs* and from the *ahurs* and *pynes* by means of *doongas.*

The average depth from the surface of water in the wells is, in the rainy season, between six and seven feet. In the rains the wells fill, and the water in them rises, but sinks again in the cold months and as the hot weather advances.

About three-fourths of the wells in use are *kutcha* and the remaining one-fourth *pucca*.

None of the wells have ever become quite dry, so far as I know, but very nearly so, when there has been scarcity of rain.

There are fifteen tanks in the town of Gya, besides many others in the interior of the district.

In 1867 the crops were above the average, in 1868 far below it.

Blight of crops is liable to occur from specific causes, such as the blight insect, or from want of rain.

The local supplies of grain are sufficient, under ordinary circumstances, for the wants of the people, but for the last three years there has been, more or less, failure of the crops and scarcity of food, owing to the want of timely rain; hence, grain has been dear, and has been imported from Patna, as also from Arrah; otherwise food on the whole is cheap."

SANITATION, CONSERVANCY, &c.

"Regarded in a sanitary point of view, the town and district of Gya are healthy, which indeed is a matter of surprise, as no very stringent conservancy rules are in force.

The Municipal Commissioners are supposed to be responsible for the sanitation and conservancy of the place.

I do not consider that much real or active interest is taken in the subject except by the Joint Magistrate and myself. A meeting is held now and then, but, as is often the case, it ends in talk rather than in action.

Sanitary improvements have been proposed but not effected."

"*Local causes of malaria.*—None exist that I know of; the locality is not malarious, and no trees have been imprudently cut down.

Drinking-water is obtained from wells, rivers, streams and tanks; but the water from tanks is rarely used for drinking purposes.

The drinking-water generally is good and wholesome; I do not think it has ever been analysed. The natives think both the well and Soane water pure, especially the latter.

The supply of water is abundant.

Surface drainage passes into some of the tanks, but not into the wells.

Some of the tanks are surrounded by wells or enclosures; and around them are drains which are in a dirty state, and do not answer the prupose for which they were intended.

The wells are protected by coverings or frame-works of wood called "*junglas*."

The source of water-supply is now and then cleaned out, but not systematically.

The streets of Sahibgunge are unusually wide and clean for a native town, and this is almost the first thing that strikes the attention of visitors to the place, and many of them, specially those about the market-place, are from twenty to twenty-eight yards wide; the streets of Gyajee are very narrow and dirty, six to ten feet wide.

The general condition of the houses, both within and without, is dirty. They are certainly not well ventilated and are lighted by wicks and linseed oil.

The drainage-water flows into the river, tanks or low ground.

The depth of the drains is from three to four feet. Those near the jail are kept clean but those of the town proper are often dirty; the former are cleaned out daily and repaired when necessary; the latter three or four times a year only.

I have not observed any sickness, or results, of any consequence, which could be traced to bad drainage.

The place is fairly drained and nothing but the most rigid supervision could improve matters."

" No cess-pits or well-privies are made use of at Gya, that I know of; nor do public latrines exist.

The dry-earth system is adopted in the jail only, and the *excreta* of the prisoners and of the sick in the jail hospital, are received in trenches dug for the purpose: but no arrangments of this kind obtain for the town, and the excrementitious matter of the mass of the people is allowed to remain unburied in the fields or on the sandy banks of the river.

Stable litter is used as manure, but more frequently it is seized upon by the poorer classes, who prepare it for fuel by drying it in the sun and then selling it. As fuel, it is used both in culinary operations and in the baking of earthen pots."

CREMATION AND INTERMENT OF THE DEAD.

" The bodies of Hindoos are burned in the middle of the river-bed of the Phalgu when the river is dry, and by the side of its banks when full. It is done with due care except when there may be excessive rain.

The bodies of Mahomedans are interred at the depth of from five to six from the surface of the ground, and generally at the distance of a mile from the town.

Corpses are not thrown into streams or pools.

With regard to cremation the friends or relatives of the deceased see that the body is reduced to ashes by burning: and the zemindars, in the case of poor people belonging to their own villages, are generally willing to give the wood for the funeral pile, and make arrangements with the chumars to burn the body. Neglect sometimes takes place in the time of heavy floods."

SLAUGHTER OF ANIMALS AND DISPOSAL OF THEIR CARCASES.

" Animals are killed in the slaughter-houses of the Kasaitola which are close by the dwellings of the people.

The meat is sold ; some of the bones are thrown into the drains near houses where the dogs get at them, and the rest made use of for fuel by the butchers themselves.

The offal of the slaughter-yard is sold, the low castes buy it at 1 pice a seer."

OBNOXIOUS TRADES, NUISANCES, &c.

"A great nuisance arises from the custom which some of the butchers have of burning the bones of animals for fuel: this creates a most unpleasant and sickening smell.

The manufacture of bricks, which is carried on near the town is objectionable. I do not believe that any positive harm arises from this to animal life, though it may do injury to vegetation in the immediate neighbourhood of the kilns. The rapid diffusion of the gases evolved, carbonic acid and oxide, sulphurous, and hydro-sulphuric acid &c., into the surrounding atmosphere, must be too rapid for any mischief to accrue to human beings, although it is said that the air, at its immediate exit from the chimneys of the furnaces, is fatal—if inhaled—but this is a contingency which I imagine never happened.

The general atmosphere is not tainted, but that near the brick kilns is charged more or less with the gases evolved ($C. O.^{2.}$ &c.) Unpleasant odours are perceptible in many parts of the old town and are due to specific causes of localized uncleanliness, such as arise from the innate careless and dirty habits of the people.

I believe that food is very indifferently cooked, amongst the natives.

Intemperance is common and leads to impairment of the function of digestion, and to diseases of the liver and kidneys, terminating in dropsies and death.

The most pernicious drink is perhaps the country rum,—prepared from the *Mowah*—when taken to excess."

SPECIFIC DISEASES.

"*Fevers.*—There is nothing peculiar in the fevers of this place, and they yield to treatment generally, and are not accompanied by any unusual train of phenomena.

Cholera.—Cholera is undoubtedly endemic in the town and neighbourhood of Gya.

Small-pox.—This disease I believe, exists in an endemic form in this district, but I am not acquainted with the histories of any epidemic visitations of the malady."

"*Other Diseases.*—Under this head I may call attention to the fact that, in three instances I have seen in the case of children, what appeared to be purely epileptic attacks, merge into *apoplexy* after the second attack, and death take place by coma. This has struck me as being very unusual, and in my extensive experience of epileptic seizures as House Surgeon under Dr. Brown Séquard at the National Hospital for the paralysed and epileptic, I never saw anything like it before.

EPIDEMICS.

"I am unable to give, from my own personal knowledge, the history of any epidemic in this district, except that of cholera, as it occurred in 1866. (vide, my Sanitary Report for that year, which treats of the several points mooted under this head, origin, date of appearance, predisposing and existing causes, &c., Section 41 (1, 2, 3, 4.)

A table, which I shall give, shows the number of admissions and deaths from cholera, in the jail hospital at Gya, for the last twenty-nine years, and comprises the only *accurate* statistics on this subject that I can furnish. In the year 1866, the number of deaths from cholera in the town of Gya itself was estimated at 600. This includes all classes, whether inhabitants of the town of Gya or travellers, and the numbers of deaths in the district at from 1,200 to 1,400.

I do not think that cholera is communicable from man to man, though I am acquainted with one or two instances in which this appeared to be the case. But these, put against the numbers of cases which I have seen in which no such results followed, lead me to attach but little importance to the theory that the disease is communicable in this way.

I am unacquainted with any instance in which the disease could be plainly traced to direct importation from an "infected locality" or to the use of impure water ; though I would always think it necessary to change the source of water-supply if there were any doubts about its purity, during a cholera epidemic.

With reguard to the duration of cholera—its subsidence and disappearance, and its connection with any particular meteorological conditions, I may state that in 1866 the disease prevailed in the Gya district from early in the month of June till the middle of November. It was most deadly in the month of June and July, until the 27th of the last mentioned month, when it began to subside after a violent thunder storm which took place on that date, and finally disappeared altogether in November. It was only in the months of June and July that the disease raged epidemically."

As is well known, Gya is a celebrated place of pilgrimage, and a very general idea obtains that the occurrence of cholera is associated with the congregation of the pilgrims. I believe myself that this supposition is an erroneous one and not borne out by facts as I shall endeavour to show.

Pilgrims come to Gya to do *pinda* more or less all through the year, and from all parts of India inhabited by Hindoos, but there are three fixed times at which they come in the largest numbers. (*a*) From the end of February to 16th March (pilgrims from Lower Bengal, Calcutta, and its vicinity) : (*b*) From the end of August to 16th September (pilgrims from the Western Provinces) and (*c*) from the end of November to 16th December (pilgrims from Tirhoot and Nepaul.)

The places at which they assemble are the following ; and it is worthy of observation that all these places are in, or near the town of Gya.

1.—" Phalgu" river at Gya.
2.—" Ramsita hill" also at Gya.
3.—" Bodh-Gya" where there is a famous temple and six miles from Gya.
4.—" Vishnu-Pod" at Gya.
5.—" Seetakoond" ditto.
6.—" Beternee Tullao" ditto.
7.—" Achabut" (the last *pinda* is held at this place) also at Gya.

The number of pilgrims who visit Gya in the course of the year, for the purpose of doing *pinda,* varies from 100,000 to 200,000.

Now it may be said, that because cholera did not exist in an epidemic form before the arrival of the Bengalis or first batch of pilgrims, but assumed an epidemic form 2½ months after their departure, that this very circumstance would tend to show, that the Bengali pilgrims brought the germs of the disease with them and established it here. This objection, however, is met by the fact that the usual cholera season in Bengal is the month of April, and the Bengali pilgrims arrive at this place at the end of February or early in March, and leave after the 16th of that month. So that they have not only arrived, but have also left, prior to the cholera season in Bengal, and therefore it is next to impossible that they could bring the disease with them : and if they did, it would surely make its appearance immediately on, or very shortly after, their arrival, and not so late as 2½ months afterwards.

"Another point in connection with the cholera epidemic of 1866, is singular, and puzzles me a good deal. I have said that the disease assumed an epidemic form 2½ months after the departure of the Bengali pilgrims, that is, at the commencement of June, and was on the decline on the arrival of the second batch of pilgrims (those from the Western Provinces) from the end of August to the middle of September. According to all that is written on the subject of cholera, the arrival of these pilgrims ought to have given a fresh stimulus to the spread of the disease. Why did it not do so?

A third circumstance, which tends to prove that the prevalence of cholera has nothing to do with the assemblage of the pilgrims, and that they do not bring or generate the disease here, is seen in the fact that cholera *prevails most* precisely in *those months* in which the place is *least visited* by pilgrims. The following statistical tables, which I have prepared, will show that this is the case. The tables give the number of admissions into the Jail-Hospital from cholera for twenty-nine years past, and form a fair test—as in epidemic visitations of the disease, the prisoners in the jail would scarcely escape, especially when no quarantine had been established."

Table A gives a collective view, and table B one in detail :—

A.

	July*.	August*.	June*.	May*.	March†.	April.	September†.	October.	November.	February.	January.	December†.
For 29 years past.	302	187	152	111	82	36	35	19	13	8	7	7

* Pilgrims do not come in large numbers in these months. † Pilgrims come in large numbers in these months.

B.

Table showing the number of admissions into the Jail-Hospital, Gya, from cholera, with results for 29 years past, viz., from 1840 *to* 1868.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total	Recovered.	Died.	Rain-fall in inches.
1840	...	1	3	3	25	46	4	4	2	1	...	1	90	73	17	No records of rain-fall until the year 1851, and the records for that year do not appear to be correct, and therefore are not entered.
1841	...	...	...	2	10	40	9	8	5	..	3	3	80	62	18	
1842	1	...	39	8	34	7	90	8	2	...	...	...	189	135	54	
1843	...	...	...	1	3	9	4	5	...	2	3	...	27	16	11	
1844	1	2	8	...	2	13	2	3	2	3	...	1	37	22	15	
1845	4	3	11	3	3	4	6	14	12	7	...	...	67	45	22	
1846	...	...	...	..	...	7	25	1	1	...	2	2	38	21	17	
1847	...	...	2	3	1	9	2	16	...	4	3	...	40	21	19	
1848	...	...	1	...	3	2	4	2	1	1	...	...	14	8	6	
1849	...	...	...	...	10	6	1	1	1	...	1	...	20	16	4	
1850	1	1	2	6	1	1	7	3	...	...	...	...	22	15	7	
1851	...	...	...	...	...	...	7	1	...	...	...	...	8	3	5	
1852	...	...	2	1	1	1	...	2	...	..	...	...	7	6	1	25·125
1853	...	1	5	2	1	3	47	18	2	...	...	...	79	47	32	32·750
1854	...	...	2	...	4	1	1	...	1	...	...	...	9	8	1	20·60
1855	...	...	...	...	...	...	24	4	4	1	...	...	33	18	15	No record
1856	Jail records for this year cannot be found.									...	...	...	...	...	...	Ditto
1857	Records missing till July.						48	...	...	...	...	...	48	26	22	Ditto
1858	...	...	...	...	...	...	...	10	...	...	...	...	10	3	7	Ditto
1859	...	...	...	2	...	...	...	...	...	...	...	...	2	2	...	Ditto
1860	...	...	5	2	...	1	2	57	...	...	...	...	67	30	37	Ditto
1861	...	...	...	2	7	...	...	...	...	...	...	...	9	6	3	Ditto
1862	...	...	...	...	...	...	...	1	...	...	...	...	1	...	1	Ditto
1863	...	...	2	...	5	..	8	26	...	...	...	...	36	27	9	Ditto
1864	...	...	...	...	1	...	...	...	...	...	...	...	1	..	1	18·2
1865	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	18·3
1866	...	...	...	...	...	1	16	3	2	...	1	...	23	11	12	29·375
1867	..	...	...	1	...	1	...	...	...	...	...	...	2	2	...	61·08
1868	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	27·41
	7	8	82	36	111	152	302	187	35	19	13	7	959	623	336	252·840

The figures stand somewhat high for the months of March, but thirty-nine of these cases happened so far back as March 1842 : eight in March 1844, and eleven in March 1845 ; leaving twenty-four cases only, ranging over a period of twenty-five years, which appear to have been scattered or sporadic cases. There are no remarks to be found showing the probable causes of the large number of admissions from cholera in the month of March 1842.

I believe that cholera is endemic in the town and district of Gya. As regards its prevalence in the town, when it assumes an epidemic form, it is due probably to the state of the river Phalgu, along the sandy banks of which the masses of the people defœcate, so that when the rains set in, fermentation of excrementitious matter must take place to a very great extent. I do not mean to say that the fermentation of this matter itself sets up cholera, but that it may assist in kindling the disease by rendering the atmosphere impure, and thus giving the choleraic poison, whatever it is, a medium for its ready diffusion. That the cholera poison exists in the atmosphere, in a latent state, I have no doubt in my own mind; that it is multiplied by impure conditions of the atmosphere, and that some people are susceptible, while others are insusceptible to its influence; and that this amounts to a kind of constitutional aptitude or inaptitude for the reception of the poison into the system.

That the poison of cholera does exist in the atmosphere is shown, I think, by the fact that cases of cholera become less severe and more amenable to treatment after a thunder-storm, the interpretation of this being that the air becomes purified by the development of ozone, which always exists in the largest quantity after a thunder-storm, and the cholera poison is dissipated by the electric change or becomes more or less innocuous in proportion as the atmosphere is pure.

Cholera prevails most in the town and district of Gya, in the months of July, August, June and May. The months are enumerated in the order in which the disease obtains.

Many of the cases of cholera in 1866 terminated rapidly, the victims being sometimes carried off in from half an hour to two hours from the commencement of the attack."

FAIRS.

" Several fairs are held in this district, and the dates and places at which they take place, as also the number of persons (average number) attending each are given in the following table :—

Names of places where fairs are held.	Names of fairs.	Dates of fairs.	Probable No. of persons frequenting each fair
(*a.*) IN THE INTERIOR OF THE DISTRICT.			
1. Daokoond Pergunnah Urwal ...	Daokoond ...	13th or 14th Phalgoon (February) ...	5,000
2. Kishoonpore " Kootoombuh	Rannowmi ...	24th Choit (March)	4,000
3. Dao, " Charkanwun	Chut	22nd Kartik (Oct.) 22nd Chiet (March)	1,000
4. Bhararj " Goh ...	Ashnan ...	30th Kartik (October)	1,500
5. Jehanabad	Ditto ...	Ditto Ditto...	1,000
6. Jamore " Siris ...	Ditto ...	Ditto Ditto...	1,000
7. Rati Gunj	Bisoowah ...	2nd or 3rd Boisakh (April) ...	2,000
8. Saraisah " Nuhare ...	Shewratree ...	13th or 14th Phalgoon (February) ...	2,000
9. Nuddrah ... Near Keeda Serai ...	Cheerugbah ...	About 25th Phalgoon (February) ...	2,000
10. Beetho ... One *koss* N. of Gya.	Ditto ...	About 9th Pous (December) ...	1,000
11. Kensowah ... Two " " ...	Ghazimeeah ...	26th Jait (May)	4,000
(*b.*) IN THE TOWN OF GYA	1. Dosahrah ...	26th Asin (September)	20,000
Ditto	2. Asahnan ...	30th Kartik (October)	5,000
Ditto	3. Chut ...	22nd ditto ditto	5,000
Ditto	4. Bisoowah ...	2nd or 3rd Boisakh (April) ...	5,000
Ditto	5. Mohurrum ...	27th ditto ditto ...	30,000
Ditto	6. Tilsookrat ...	4th Magh (January)	1,000
Ditto	7. Sownisyle ...	30th Srabun (July)	5,000

I do not consider that these fairs constitute a source of disease, because they last only for a day or two, and the people who frequent them, quickly disperse.

VACCINATION—INOCULATION.

Vaccination is carried on through the agency of the medical staff generally—Civil Surgeon, Sub-Assistant Surgeon, Native Doctors and Government Vaccinator. Three country inoculators employed as vaccinators are also entertained by the Municipality.

It is not practised to any great extent, because the people are most averse to it, and fight against it in every conceivable way. The majority of them worship the goddess *Sitala* or *Mata,* who according to their belief, presides over small-pox, and think, that if they take to vaccination they provoke her displeasure, and tempt her to destroy them by visiting them with small-pox, in a deadly form. When *Bari Mái,* or small-pox, makes its appearance of itself, the people hail the event as one of good omen, and think that it is the most propitious thing which could happen, and say "*Mata ap se niksa,*" *i. e.,* Sitala has appeared of her own accord. Not only the common people are imbued with these superstitious notions, but the higher classes are equally influenced, and both are bigotted in the extreme. Gya itself is a hot-bed of Brahmanism, and every thing tending to civilization is met with much opposition; vaccination especially is regarded as a gross innovation upon the old and established usage of inoculation. Such of the natives as either themselves consent or allow their children to be vaccinated, hold that particular seasons are favourable or unfavourable for the purpose. They object to the operation in the months of November and December, are more *rázi* (willing) in January and February, but give the preference to the months of March and April.

The following table shows the results of vaccine operations for the past three years:—

YEARS.	Total number vaccinated.	Successful	Unsuccessful.	Doubtful.
1866 ...	353	234	101	18
1867 ...	396	230	147	19
1868 ...	539	242	295	2

If arm to arm vaccination could be introduced, the returns would show far more favourable results, under the head of successful cases: but this is an impossibility in this district, as the parents of the children object most strongly to any of the lymph being abstracted from the vesicles, much less will they hear of their children being taken about from one village to another. But until the system of arm to arm vaccination is established, the number of successful cases will always be comparatively few, as taking about lymph between glasses, and on ivory points, is but a poor substitute for the fresh, active virus, and in numberless instances the crusts are quite inert, however carefully used. It seems to me that at the present day too much credence is put in the efficacy of crusts by some medical men. As far as my own experience goes, I think their use is unsatisfactory, though I have used them, and seen them used in various ways, most carefully. I believe that the younger the lymph is the more active and certain it is, and that after the 9th day it cannot be depended upon. And why a preference should be given to crusts, over carefully preserved 6th or 7th day lymph, I am at a loss to understand. I am of opinion that lymph does not keep well in hermetically sealed tubes. I have invariably found that those supplied to me are not properly filled, and that they contain considerably more air than lymph, hence decomposition is almost a certainty. The best way of preserving lymph is to keep it between plates of glass dry. If the surfaces of the glasses are placed in contact while the lymph is still moist, the latter acts as a cement, the nicest apposition is effected, and the lymph much more effectually secured against atmospheric influence than by any other mode of preservation. I am quite convinced that much of the lymph which I have received from Calcutta, and the Punjaub, has been utterly useless; often the lymph has quite dried up in the tubes, and as often, the tubes have contained more air than lymph, and the latter has deteriorated. The Government Vaccinator is possessed of much experience, and is a particularly neat manipulator, and I myself have used the lymph with the greatest care, and I feel sure that the want of success has not been due to any carelessness in the mode of vaccinating. I must confess that the vaccine returns from some places seem to indicate an unprecedented amount of success, which is somewhat disheartening to those who, by the greatest care, cannot arrive at the same results.

The prejudices of the people have not been overcome in any degree; they are as obstinate as ever. Vaccination is carried on in the town and district of Gya under a host of difficulties, and none but those who have had personal experience of it, can have any conception of the aversion shown by the inhabitants to the procedure. I have entered into the subject fully several times in reports furnished to the Deputy Inspector General of the Circle. At Sherghotty, one of the Sub-Divisions of Gya, the villagers were prepared to resist by *latti* and sword, if anything like compulsion was resorted to.

Inoculation is prohibited in the town, but it is still carried on in the district.

NATIVE PRACTITIONERS.

There are about sixty *boids* in the town, and about 300 in the district. The *hakeems* are to be found in the town alone, and number from ten to twelve.

I have no personal knowledge of this class of men, but their influence amongst the people is I believe decreasing. There are very few *kobirajes* in this district.

I do not know anything about the modes of practice of these men, except that they are in the habit of starving their patients in fevers and inflammations, from one to two or three weeks,—so reducing them to the very brink of death."

34.—PATNA

THE REPORT IS BY DR. R. F. HUTCHINSON, CIVIL SURGEON.

Patna.—*Latitude* 25° 37′ 12″ *North.*—*Longitude* 85° 7′ 32″ *East.*

"The city is on the whole healthy; neither leprosy nor elephantiasis are common.

Here as elsewhere, we have cholera in the hot months and during muggy breaks in the rains; intermittent fevers during the months of evaporation (September and October), and bronchial and rheumatic affections during the cold months. The same remarks apply to the district as to the city

The following table shows the results of vaccine operations for the past three years :—

YEARS.	Total number vaccinated.	Successful	Unsuccessful.	Doubtful.
1866 ...	353	234	101	18
1867 ...	396	230	147	19
1868 ...	539	242	295	2

If arm to arm vaccination could be introduced, the returns would show far more favourable results, under the head of successful cases: but this is an impossibility in this district, as the parents of the children object most strongly to any of the lymph being abstracted from the vesicles, much less will they hear of their children being taken about from one village to another. But until the system of arm to arm vaccination is established, the number of successful cases will always be comparatively few, as taking about lymph between glasses, and on ivory points, is but a poor substitute for the fresh, active virus, and in numberless instances the crusts are quite inert, however carefully used. It seems to me that at the present day too much credence is put in the efficacy of crusts by some medical men. As far as my own experience goes, I think their use is unsatisfactory, though I have used them, and seen them used in various ways, most carefully. I believe that the younger the lymph is the more active and certain it is, and that after the 9th day it cannot be depended upon. And why a preference should be given to crusts, over carefully preserved 6th or 7th day lymph, I am at a loss to understand. I am of opinion that lymph does not keep well in hermetically sealed tubes. I have invariably found that those supplied to me are not properly filled, and that they contain considerably more air than lymph, hence decomposition is almost a certainty. The best way of preserving lymph is to keep it between plates of glass dry. If the surfaces of the glasses are placed in contact while the lymph is still moist, the latter acts as a cement, the nicest apposition is effected, and the lymph much more effectually secured against atmospheric influence than by any other mode of preservation. I am quite convinced that much of the lymph which I have received from Calcutta, and the Punjaub, has been utterly useless; often the lymph has quite dried up in the tubes, and as often, the tubes have contained more air than lymph, and the latter has deteriorated. The Government Vaccinator is possessed of much experience, and is a particularly neat manipulator, and I myself have used the lymph with the greatest care, and I feel sure that the want of success has not been due to any carelessness in the mode of vaccinating. I must confess that the vaccine returns from some places seem to indicate an unprecedented amount of success, which is somewhat disheartening to those who, by the greatest care, cannot arrive at the same results.

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I should have mentioned, too, that here, as elsewhere, eruptive fevers occur during March and April, small-pox particularly."

XIII. I should certainly say that the population of this city and district is generally healthy, both males and females able-bodied and industrious. I have no experience either of improvement or deterioration of health, but should say it was in *statu quo.*

XIV. The population of Patna city is supposed to be about 1,75,000, men, women, and children, and this result is arrived at by allowing five souls to every house, of which there are at least 35,000.

(*a.*) No reliance, of course, can be placed upon such a crude calculation.

(*b.*) There is no registration of births; sometime ago the Municipality submitted a scheme to Government, but no orders have as yet been received. The deaths are duly registered. In the city the people are required to furnish the information to the Police, and in the mofussil, the chowkeedars report the deaths in their villages. In this way a kind of mortuary return is furnished, but of no intrinsic value, as the deaths are given under the vague terms *tap, mata, bade,* or *surdee.* Cholera is correctly returned generally; though an ordinary bilious attack, *bad-huzmee,* is often confounded with it.*

(*c.*) The Civil Surgeon has nothing whatever to say, in any way, to these returns, nor is he even furnished with a copy. In my opinion he, and he alone, should have the management of the registration, the Police assisting, and the returns going in through the Magistrate.

I append an extract of observations taken by myself during the present year. Nothing reliable exists prior to September 1867. The year has been noted for its comparative coolness and scanty rain-fall; 24·687 inches of rain only having fallen, compared with 47·415 of the former year.

MONTHS.		Barometer.	Dry bulb.	Wet bulb.	Maximum.	Minimum.	Wind.	Sky.	Rain.
		°	°	°	°	°			
November 1867	...	30·055	79·	66·	88·	59·	N-W.	Clear	0
December ,,	...	29·815	68·	59·	76·	63·	W-N-W.	Ditto	0
January 1868	...	·700	65·	51·	75·	51·	W.	Ditto	1·450
February ,,	...	·788	70·	62·	74·	50·	W.	Ditto	2·030
March ,,	...	·783	84·	64·	89·	62·	E.	Ditto	0·3
April ,,	...	·670	90·	73·	96·	60·	E.	Ditto	2·20
May ,,	...	·656	91·	77·	96·	64·	E.	Ditto	1·4
June ,,	...	·496	92·	81·	94·	72·	E.	Cloudy	5·06
July ,,	...	·429	95·	81·	96·	76·	E.	C. K.	4·745
August ,,	...	·517	86·	78·	88·	73·	W.	C. I.	4·102
September ,,	...	·580	89·	81·	88·	74·	E.	C. K.	3·42
October ,,	...	·728	86·	71·	90·	65·	E.	Clear	·04

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* Bile is called *Peeth.—Bud-huzmee* is indigestion.

Dr. Hutchinson believes the climate of Patna and the neighbouring districts to be the finest in Bengal. He thus writes—"We have neither the relaxing damp of Lower Bengal, nor the fierce hot winds of the North-West. From October 15th to March 15th, we enjoy a climate and season unequalled any where, an uninterruped succession of glorious weather, bright and sunny days and cold nights. The great thermometric extremes, of at least 40° occasioning no inconvience. Easterly winds prevail a good deal, but their depressing influence is counteracted by a fair mixture of the hot though bracing westerly breezes. Our seasons may be summed up thus: from January to the end of March, west winds prevail; then the wind changes through the south to the east, and so continues until the rains set in about June 15th. Breaks in the rains are alway occassioned by change of wind, through north to west. But east winds predominate until the end of September, when it begins to chill, and the first change of wind to the west brings in the cold weather. The rains break up in the middle of September. There are, or ought to be genial showers at the end of October, and about Christmas, and they are always accompanied by extremes of cold."

SANITATION AND CONSERVANCY.

"The sanitation and conservancy of this great city may be described as almost *nil* in proportion to its wants. I show in a note* what is really done, and these great operations are under the control of an impoverished Municipality. We have the will to do a great deal, but not the power, for all our resources are drained by the insatiable Police. A willing ear is lent to all proposals for improvement, but then there is the shrug of the shoulders and "where's the money to come from," Not only is the conservancy and sanitation shelved, but there is positively not a light in the city. It is therefore, but of little use to record what I have recommended; but the main points I have urged have been, opening up new and spacious cross streets; filling up existing hollows, which are merely gigantic ash-pits; having a better system of dirt carts and *mehters*, and having at least one latrine in each *mokullah*."

Dr. Hutchinson expresses the opinion that, as malaria is more deeply studied, it will be found to be "only our old friend CO_2."

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* *Note.*—Annual Municipal collection		Rupees	45,000
Of this, goes to Police		„	30,000
„ „ Conservancy		„	6,000
Number of carts	15		
Cost for feeding the cart bullocks		„	2,160
Number of Mehters	20		
„ of latrines	1		
Monthly cost		„	4

Thus there is one conservancy *mehter* to 8,750 inhabitants.

Bronchocele occurs at Patna. The water is impregnated with lime and magnesia.

The main street of Patna is twenty-five feet broad; the off-shoots vary from six to fifteen feet. The streets are on the whole clean.

There is not a single house in Patna which is properly ventilated; none are lighted except by the door, or perchance a small grated frame.

What is called the *tattee*? This is made of mats, and is attached to the back and outside of a house; but as fields run right up into the city, they are resorted to almost universally, and the *pigs* attend to the conservancy.

In this city, and I fancy in other mofussil cities, there is very little real filth to dispose of.

The few *tatties* are emptied by *mehters*, and the contents thrown behind the nearest prickly fence hedge, where the pigs are always in readiness; then the remaining possible general filth can only consist of ashes and the sweepings of the house, with now and then a dead cat or an old clout. In this great opium district the ashes are carefully hoarded, to be sprinkled over young poppy plants; and the morsel of sweepings goes into the street. In stables and cow-yards the dung is converted into fuel, so that there is wonderfully little to cart away; and this is in keeping with the simple habits of the people; and it is to this scantiness of real filth or decomposable matter, that the healthiness of great mofussil cities like Patna is due. There is no wet filth of any kind removed, nor do I know of any."

CREMATION AND INTERMENT OF THE DEAD.

1-2. "Bodies are burned on the river bank, effectually and without any surveillance. Where poverty prevents complete cremation, the body is scorched and then shoved into the river.

3. Three to five feet, and the cemeteries are in and around the city to the south."

Dr. Hutchinson, remarking on the astonishing quantity of *suttoo* that can be devoured by a native at one sitting, thus writes—"A sturdy *ryot* will think nothing of four seers at one time, and he will go on the strength of this, until the third day. This power of storing away huge quantities of food reminds me of a constable in the Police Force, who has offered to eat before me, at one sitting-

5	seers	of	*Choora* (parched rice)
5	,,	,,	*Duhee.*
1	,,	,,	*Ghoor.*

and on the strength of 22 lbs. of solid *ingesta,* to walk sixty miles on a stretch, without any further meal! Before sending this in, I shall test the man and record the result in a note."

" I have heard nothing more of the voracious constable."

Doctor Hutchinson, describing the ordinary sameness of diet amongst the poorer classes of natives quaintly observes. " One obliged to live upon *suttoo* has not much chance or scope for change, except perhaps as regards the end at which he bites his chilli."

Pân is consumed pretty freely; when carried to excess it occasions constipation of an obstinate description (due to the large admixture of catechu:) and its sequelœ are hœmorrhoids and apoplexy resulting in hemiplegia and often in death. I now find it a fixed rule that if a native comes to me with red lips and teeth, (*sick.*) he comes to be treated for *gubzeeut* or *bawasir*; and if a hemiplegic comes up he allows at once the attack was preceded by constipation induced by excess in *pân,* and that the immediate cause was the straining during defœcation.

The practice of taking opium is largely indulged in by the Mahomedans of this city, among the upper classes of whom it may be said there is hardly an individual who has not taken it from his infancy. And yet I am not prepared to state from experience that the practice is attended with any unusual mortality. Like *pân* it induces obstinate constipation and the accompanying evils described under that head, but confirmed opium-eaters come less under view than those who over-indulge in *pân.*

Opium-eaters, conventionally so called, are of three classes.

1.—*Afeemees.*

2.—*Madakees.*

3.—*Postees.*

1. Includes those who swallow crude opium. Wealthy Mahomedans give their children opium from birth, commencing with minute pellets of the drug stuck on to the palate and allowed to dissolve gradually. But regular *afeemees* go in for pills, varying from five grains to one drachm, morning and evening.

2. Includes thoes who smoke opium. The drug is made up with a kind of extract with *pân* leaves chopped up fine, and then divided into large pills of 10 to 15 grains; this is *madak*. The *madakee* sub-divides these masses into small 2-grain pills, and provides himself with a small *chillum*. When about to indulge, he spreads before him various sweetmeats or spices, more frequently the former, puts a pill into the *chelum* and on it a small *gool*, red hot, then with one prolonged inspiration he consumes the pill, takes a nibble at the sweets or spices, and proceeds with a second. In this way 10 or 15 pills are disposed of, and the full effect of the drug induced.

3. Includes those who drink a watery extract of opium. *Postees* are of two classes. The *Koerees*, who cultivate and collect opium, mass a lot together from the recent and inspissated juice, a liquid exudes called *passewa*, and this is greedily mopped up with rags, which are afterwards infused in water, and the mess drunk off. Another class satisfy their cravings by making a kind of emulsion of dried poppy heads (*posta*) from which the opium has been extracted by tapping, and drink that. Some, to make sure, drink a mixture of the infusion of rags, (which by the way are called *kâffâ*) and poppy heads. With *postees* imagination goes a long way, for they can get but little of the real drug.

This is not the place to describe the phenomena accompanying indulgence in opium, or the unspeakable misery which accompanies deprivation of the drug.

Indulgence in opium is, I think, exceeded in this city by indulgence in *gânjâh* and *bhâng*; but I am not prepared to state whether any unusual mortality accompanies the practice—I think not; but it is undoubtedly a more prolific source of mental derangement, (permanent that is,) than the former.

A good deal of confusion exists as to the manner in which these intoxicating drugs are used, owing to the Hindoostani word '*pina*' being applied alike to *gânjâh* and *bhâng*. *Gânjâh* is smoked, and never drunk; *bhâng* is drunk, and never smoked. Neither are ever eaten.

Gânjâh is the dried leaves and flowers of the plant, and is always smoked, mixed up with tobacco. I have fonnd out that an inveterate *gânjâh*-smoker has a corn on the outside of the distal phalanx of the right thumb, induced by rubbing down the *gânjâh* and tobacco on the palm of the left hand.

Bhâng is a draught made up with *gânjâh*, the standard of which is

Water	1 lb.
Gânjâh	1 dr.
Black pepper	1 „

spices, ghoor, or cucumber seeds are mixed up or not according to taste.

" *Churrus*, the resin of the plant, not sold in this city, is also smoked.

More than 75 per cent of so-called mania cases admitted into this (the Patna) asylum, are due to excess in *gânjâh* or *bhâng*.

This pernicious indulgence is within every one's reach, for one pice weight of ganjah (1½ dr.) sells for two pice, and this quantity will madden six novices; and the same outlay will pay for an intoxicating draught of *bhâng*.

UNWHOLESOME LIQUORS.

I am not prepared to state that the intoxicating liquors of this city and district are more unwholesome than those of the same class elsewhere. Intemperance is more common among certain castes and at certain seasons; thus the *gowalas* are notorious drunkards; and at the *Hooli* three out of four you meet in the streets are hopelessly drunk; yet there is no undue mortality in the caste, or during the Saturnalia, except that arising from broken heads. The two intoxicating beverages of this city and district are the *abkaree* spirit, distilled from the fermented flowers of the *mhowa* tree, a most fœtid preparation; and *taree*, *taroo* or *daroo*, the fermented sap of the fan or tar palm.

SPECIFIC DISEASES.

Beyond a singular epidemic of measles to be presently noticed, I have had no experience, during my four years charge, of any epidemic. Cholera and intermittent fever are always endemic here, but neither have as yet, *i. e.*, in my experience, assumed any alarming proportions. The other diseases are unknown except sporadically. Elephantiasis and bronchocele are undoubtedly indigenous.

STATISTICAL RECORDS.

None are in existence except those on a limited scale at the Dispensaries.

I have never seen a case of relapsing fever.

EPIDEMICS.

During last February and March measles prevailed largely in Dinapore; it ran through the large Roman Catholic School at Koorjee, three miles from this, and then appeared in the convent, where I had sixteen cases, and one death in a young child from bronchial complication. At the same time small-pox (*mata*) was reported as prevalent in the city and district, and it was said to be so bad in the Gya District that I was directed to despatch three of my vaccinators thither."

"Early in March, small-pox (*mâtâ*) was reported to have broken out at Nuggur Nahso, a village about twenty-five miles from this, thirty-four cases and sixteen deaths having occurred. I at once went off, but strangely could find no traces of small-pox in those who had recovered, or who were still ill, and at once recognised the epidemic to be one of measles, with strong tendency to bronchial complications, beneath which the extreme young and extreme old had sunk. Nor could I find any traces of small-pox in those I saw in the city, and it became apparent, that we were passing through an unusual epidemic of measles; and so, too, my vaccinators sent to Gya found that there was no small-pox at all. The mistake arose from the use of the word *mâtá* which the *gauwár* applies indiscriminately to small-pox, measles, varicella, and in fact any eruptive disease accompanied with fever. The epidemic subsided during March; its returns have been nullified by the mistake above alluded to, for it cannot now be made out what was meant by the word *mâtá.*

VACCINATION—INOCULATION.

I have eight vaccinators, three belonging to Government and five to the Municipality. All are well employed, though we have to contend against inoculation, which is still carried on in spite of the Act. During last season 4,420 were vaccinated.

NATIVE PRACTITIONERS.

In this city there are about 100 *hakeems* and 200 *boids,* (*kobiraj* being synonymous.) I have no personal knowledge of them. I do not think their influence is so much on the wane as that natives can get advice and medicine for nothing at the dispensaries. *Hakeems* pretend to diagnose by examining both pulses and a flask of the urine (*karoora*); their remedies are always intricately composite and bulky.

INDIGENOUS DRUGS.

These are largely used in both dispensaries, by order and not from choice. They are vastly inferior to our own medicines, and are not looked after by the natives as the latter are.

SUGGESTIONS.

I am asked to suggest any measures which may tend to lessen the mortality of existing endemic diseases, such as cholera, small-pox, and fevers. The subject is a most tempting one; but I approach it with diffidence, as my views are so entirely opposed to those of the day, at least as expressed in writings on sanitation and conservancy. It strikes me that while we are ridiculously particular about one set of excreta, we entirely overlook another set, far more noxious and poisonous; that while running wildly after matters excreted by the rectum and urethra, we ignore those excreted by the mouth and the myriad excretory pores. Shut up a man's rectum and he will die, not poisoned, but from a series of sequences following a simple mechanical obstruction, his intellect will be clear almost to the last. Shut up his excretory pores, and he dies rapidly with all the symptoms of blood poisoning. Let me now apply these facts. I have shown that native houses are, as a rule, void of ventilation and light; that they are small and generally well filled with tenants, the pressure during the hot months being perhaps relieved by the adult males sleeping in the court or in the street, whereas during the cold months they crowd into the cell and close the small door. What is the result? five beings (and one *chirag*), are all at work getting as much oxygen as they can from the confined atmosphere, and giving out in return watery matter and carbonic acid gas; their skins too are busy, exhaling noxious and effete matters; these and the carbonic acid gas, being heavy, hover just above the ground upon which all are sleeping. Therefore the air inspired must, as the night advances, become impaired and impure, and must in the long run act prejudicially. I believe that this impure air, common to all native houses, sticks to them habitually; for in the absence of ventilation how can it be swept away, and it forms the *nidus* in which the cholera poison is hatched, and from which, under probably certain atmospheric conditions, it spreads abroad. If this position be allowed, then our efforts should be directed towards increasing the capacity and ventilation of native houses. We shall never eradicate cholera; no more than typhus will ever disappear from the back slums of England; the yellow fever from the West Indies, or the plague from Egypt: but we can, and should keep it in check, or rather, as much as possible, do away with the predisposing and fostering causes. Why should we not do for India what has been done in England with such marked success? Why should we not supply the Natives with *model houses and villages*. Let them see for themselves that with a very little extra trouble, they can procure for themselves healthy habitations supplied with abundance of pure air and water? I do not think there would be any difficulty in assigning a plot of ground for a model village, and offering certain assistance and inducements to those who would build thereon according to a fixed plan, no deviation being allowed.

Such villages, being built and maintained according to existing sanitary principles, would from, as it were, so many crucial tests; would be so many landmarks from which to note progress. If, for instance, in such a village, known to be free from adverse influences, cholera appears, then only two questions arise; is it indigenous, or imported? If the former, then the area for inquiry, being very limited, a conclusion must be speedily arrived at. If the latter, we shall, *cæteris paribus*, be better able to grapple with the case, and at least ascertain, positively, whether the disease be contagious.

A model village has been my dream for many years, and if allowed, I shall be happy to work out the idea to the best of my power.

1. The principal nuisance in Patna City is the Government distillery, close up to the Patna Railway Station. I append a copy of the report I sent in on the subject on 18th of last January, and merely add that the nuisance is still in full operation :

No. 7 of 18th January 1868.

To the Collector of Patna.

"I have the honor of reporting that I have minutely inspected the distillery at Bagumpore and its immediate neighbourhood. The wind was W., and as is usual on such occasions, the stench was disgusting and wide-spread, and bitterly complained of by the Railway Officials and the residents of the *mohullah.*

I found that the disgusting smell accompanies every part of the manufacturing process, (the spirit itself which should be odourless being contaminated,) and this is not to be wondered at considering the overpowering smell of the *mowah* flowers, and I think that it would be next to impossible to adopt chemical means for destroying the smell without raising suspicions in the minds of the purchasers and consumers, who would naturally be astonished at finding their darling spirit odourless.

The drainage of the place is to the north between the distillery and railway, and it is the exhalations from its large surface which are so loudly and justly complained of. In the rains the nuisance is more intolerable, because the drainage water spreads over the country, carrying with it its brown colour and disgusting stench.

The existing levels are quite opposed to any division of the drainage, nor would such division, except by closed drains, be of any use; for wherever the drains went, there would the stench accompany.

This drainage water has acted prejudicially by destroying, through percolation, the purity of the principal *pucca* well of the *mohullah* situated to the north-east of, and at some distance from, the distillery. I tasted the water and found it exceedingly nauseous."

That the distillery is positively injurious to health, I obtained ample evidence. The villagers complain of fevers (*bokhars*) as common to them, and Messrs. Sale and Arrowsmith, of the East Indian Railway, had both suffered severely from fever, the former personally, and the latter in his family.

Under these circumstances I do not hesitate in recommending the removal of the distillery and its transfer to a locality where its disgusting exhalations will be prejudicial to nobody.

35.—TIRHOOT, MOZUFFERPORE.

THE REPORT IS BY DR. E. J. GAYER, CIVIL SURGEON OF MOZUFFERPORE.

I.—Mozufferpore—*Latitude* 26° 7′ 57″ *North*—*Longitude* 85° 26′. *East.*

III. "All unhealthy.

VI. "The Police supply very unreliable returns, which Civil Surgeons never see."

VIII.—There are some cases of leprosy and elephantiasis."

Dr. Gayer, in forwarding his report, draws attention to the fact that he never sees any of the reports or returns which constantly reach the Magistrate of the district; he also remarks on the want now felt by Civil Surgeons, of a special office establishment.

The sub-soil water at Mozufferpore is found at a depth of between 15 and 25 feet. There are no canals. All the rivers silt more or less and alter their course.

"The irrigation of the country is dependent on rivers, tanks, and wells. The volume of water is generally not sufficient; failure is liable to occur from want of rain, the result to crops is disastrous, particularly this year. I do consider the natural drainage of the country interfered with by roads, &c., no particulars are available. The Mozufferpore lake is unhealthy; the shallow parts should be deepened. I consider the Mozufferpore lake to be a source of disease.

The rain-fall during last year was 24 inches; no meteorological statistics available.

The proportion of irrigated land is not known.

"Wells are used, their average depth is 20 feet; they are nearly all *kutcha.*

Many have run dry this year from want of rain.

Tanks are numerous both in town and district.

There was remission of revenue in 1866 on account of the famine.

The crops are very scarce this year.

The local supplies are most probably not enough for the people.

Food is dear.

The produce of the past year is below the average of former years.

The general sanitary condition of the whole of Tirhoot is as bad as it can be. The Municipality is responsible for the sanitation and conservancy of Mozufferpore, but no real active interest is taken in the subject as far as I know.

Several sanitary improvements have been proposed by me but none effected. I proposed, for instance, that shallow saucer drains should be substituted for the deep ditches on each side of the Mozufferpore roads; that the conservancy should extend to the removal of the night soil from the public privies, and not be confined only to removing the refuse from the public roads; that burials should not be allowed in the middle of Mozufferpore; that the butchers should not be allowed to slaughter cattle in their back-yards and in the ditches near their houses, but that regular slaughter-houses should be established and kept clean; that the Mozufferpore lake should be cleaned and deepened in the shallow places; that certain tanks should be set apart for the water supply; and that the people should not be allowed to bathe or wash clothes, animals, cooking utensils, &c., or throw rubbish in, or otherwise defile the water of these tanks; that as the water supply is very bad, a few good *pucca* wells should be made; that the number of recognised public privies should be increased and kept properly clean, carts being kept to carry away the night-soil, &c.

(a.) The local causes of malaria are numerous; many trees have been cut imprudently.

(b.) All sources are used; the people drink from marshes, ponds, &c. The water-supply is very bad; it has not been analyzed. The natives are satisfied with it.

The wells and tanks are as dirty as they can be, in very many instances, in the district. The ground in their immediate vicinity is subject to contamination from both animal and vegetable impurities, such contamination is both direct and by percolation. The surface drainage passes into the tanks, and by percolation into the wells; most wells are protected by a grating. The sources of water-supply are not cleaned out systematically; no means are adopted for preserving the purity of the water; they are full of rotting vegetation. The people bathe, wash, and drink from the same source. Cattle are allowed to bathe in the tanks. Human corpses and the carcases of animals are thrown into the river. Some of these remarks apply also to the town of Mozufferpore.

There is no plan of drainage in the district. In Mozufferpore there are deep ditches on each side of the road which overflow into the tanks and into the river; the depth of the drains averages about three feet; they are not kept clean, they are always obstructed. The place is very badly drained. No government public latrines are in use, but there are a few which are not used. There are many pieces of waste ground used as privies; they are never cleaned.

The excrementitious matter is unburied.

The excreta of the sick are not disposed of with special care.

(*e.*) There are plenty of accumulations of all kinds. There are twelve conservancy carts in Mozufferpore; they remove daily refuse matter from the streets.

There is no conservancy system.

(*f.*) The burning of bodies is not done carefully; bodies are interred about three feet deep close to human habitations, in the very centre of the town. Corpses are thrown into the river.

(*g.*) Animals are sometimes killed and cut up in the ditches in front of the shops; there are no slaughtering houses.

(*h.*) Brick-making is carried on outside the town of Mozufferpore. Hides are prepared.

(*i.*) The general atmosphere is tainted; and unpleasant odours are perceptible in many places, due to localized uncleanliness.

(*j.*) The people are, as a rule, dirty in their habits and bathe in unclean tanks.

(*m.*) Intemperance is not very common."

SPECIFIC DISEASES.

"All malarious fevers are endemic; there have been no epidemics during the past year, excepting measles, which has been epidemic at several places in the Durbhungah Sub-division, and a few cases have also occurred in Mozufferpore."

STATISTICAL RECORD.

"I am unable to furnish any useful statistics of the sickness and mortality in this district.

EPIDEMICS.

I am unable to furnish any useful information on this point.

FAIRS.

There are a few fairs held in this district, I have no information however, concerning them; they are probably sources of disease.

VACCINATION.

There are three vaccinators in this district, but they are not enough: about 3,000 people have been vaccinated.

INOCULATION.

Inoculation is regularly practised all over the district, also in Mozufferpore.

NATIVE PRACTITIONERS.

The *boids*, &c., are numerous; their influence among the people is probably very nearly the same as it has always been; the establishment of government dispensaries has, however, doubtless done much locally."

36.—CHUMPARUN, MOTEEHAREE.

THE REPORT IS BY DR. CLEMENT SCONCE.

"Chumparun is a district of the division of Patna, in the province of Behar. Moteeharree is eighty miles from Patna, and is the sudder station of Chumparun.

Chumparun lies between—*Longitude* 84° and 85′ 30″. *East.*—*Latitude* 27°
and 26′ *North*

It is bounded on the north by Nepaul, on the south by the Gunduck river, on the east by Tirhoot, and on the west by Goruckpore.

2. Chumparun generally may be considered as a very healthy district. This applies more particularly to the eastern and south-eastern portion of it. Bettiah is the chief town of Chumparun, and is the residence of the Rajah of Bettiah, the principal landowner of the district; the only other landowner being the Rajah of Ramnugger. Bettiah is a large town containing a population of 17,490. Much of the country surrounding Bettiah is

partially submerged during the rainy season. Fever is consequently common at Bettiah, it is of an intermittent type. The disease is not largely fatal to life, but produces much debility and anæmia in the patient, after the active symptoms have disappeared under treatment. Diarrhœa and dysentery also prevail, but they are less common than fever. Other diseases such as small-pox and cholera occasionally occur. Ramnuggur is the next town in point of size, it is said to contain a population of 1,329, though, I think this an under-estimate ; it is situated on the borders of the Terai towards the north-east part of Chumparun. It is the residence of the Rajah of Ramnuggur, and is chiefly occupied by Tharoos, Nepaulese, or their descendants who have settled there. This town is an extremely unhealthy one' and is said to be annually attacked by severe epidemic fever—the reason being its proximity to the jungle in that portion of the district. This year the epidemic fever appears to have attracted attention for the first time, and I spent sometime in investigating it on the spot. Out of a total population of 1,329 persons, no less than 1,093 were said to have been attacked, while thirty-three were said to have died. These statistics were given to me by people employed by the Rajah. In my report upon the subject, I stated my belief that a hundred persons had died, though my estimate was confessedly conjectural. Ramnuggur is an extremely dirty town ; I found heaps of manure lying there, in all directions and the narrow streets were choked with dirt ; several of the wells too were in a disgusting state. Some measures were taken, however, after my representations, to clean the town, and sweepers were appointed for this purpose.

3. Though Chumparun may be safely described in general terms as a healthy district, there is said to be one portion of it, in Belwa Tuppeh, where human life cannot be supported in consequence of the character of the drinking water. Many attempts, I am assured, have been made to cultivate this inhospitable region, but without success. It has always been abandoned, and is now lying waste, though it is used as grazing ground. I have no personal knowledge of the locality. In a very much less degree the portion of the district bordering on the Terai may be also said to be unhealthy, and in a still less degree the town of Bettiah and its immediate neighbourhood are also unhealthy.

5. The prevailing diseases are cholera, small-pox, intermittent fever, diarrhœa, dysentery, bronchocele and stone in the bladder, but I am unable to give even an approximate death-rate from these diseases.

6. Bronchocele is extremely common in the district. Leprosy and elephantiasis are very rare ; I do not remember a single case of the last affection.

8. The sickness at Ramnuggur has been severe this year, but I am told it is not to be regarded as exceptional. I am assured that epidemic fever annually visits that place in September, October, and November, as will be seen from my special report on this subject. The primary causes of the fever at Ramnuggur are miasmatous exhalations from the Terai, and marsh poison from the adjoining submerged lands, but the ravages of the epidemic were probably much aggravated by the extreme dirt of the town, and by the filthy habits of the people who live in it.

14. The following table gives an approximate estimate of the population of Chumparun :—

Population.

Men.	Women.	CHILDREN.	Total.
		Male and Female.	
2,50,000	2,00,000	4,00,000	8,50,000

The figures in this table may be accepted as approximately correct. They were obtained by a rough census of every village, communicated to the Collector's Office.

19. The incidence of population to a square mile is 226.

20. The whole district slopes gradually from the north-west, to south-east, which is the general direction of the course pursued by all the rivers. In the north-west, to the north of Ramnuggur, the country is hilly and covered with vast forest jungle.

The rest of Chumparun may be described as an open plain, free from jungle, which is chiefly situated on the left bank of the Gunduck, which flows through the district from north-west to south-east, a small portion only of the district being situated on the right bank, Besides the northern forests and the cultivated plains, a considerable portion of the district towards the north and north-west consists of uncultivated plains. Through the east flows the Bagmuttee river. The central part of Chumparun is intersected by the Dhunowtee, a half dry river bed rather than a stream.

21. The district is not wholly a level country, however. Towards its northern boundary is the Summessur range of hills ; this divides Chumparun from Nepaul. The highest point of this range is 2,270 feet.

22. The prevailing soil may be characterised as sandy, or as a sandy loam, and is therefore not retentive of moisture on the surface. I think twenty feet may be considered the average depth at which the sub-soil water is found, and more observations are neccessary on this important subject.

23. The nearest point of the river Gunduck to the sudder station of Moteeharee is a place called Sugrampore wich is twenty miles distant.

25. During July, August and September portions of the country are submerged. The district around Bettiah may be thus characterised. Segowlee fourteen miles north-west of Moteeharee, the military station of the district is a swampy unhealthy place during the rains, and much of the surrounding country is inundated in July, August and September. Bettiah is sixteen miles again beyond Segowlee in the same direction. I observed during the rains that a great portion of the country between Moteeharee and Segowlee was under water. It appeared submerged in one direction for many miles; the water is nowhere deep, rarely exceeding twelve inches, and generally the submergence is less. I have not observed that the country about Moteeharee is greatly submerged, which no doubt in some respects explains the healthiness of this part of the district. Four miles to the south-east of Segowlee is Sugaon. It is proposed I believe to remove the sudder station to this point; I observed, however, that on its eastern aspect during the rains, the neighbourhood of Sugaon is submerged. Had the rain-fall of last year reached the normal quantity, I think the inundation would have been much more considerable. Though I have submitted a special report on Sugaon, I think it right to draw further attention to the matter here, the removal of a station being an important matter.

Marshes, swamps, rank vegetation and valleys do not exist in the district. Some lands are temporarily submerged for one or two months, but cannot be properly called swamps; close to Moteeharee are two curved lakes of stagnant water, like those which are so numerous in the district. These lakes are about two miles long, with a breadth of 100 yards, varying from three feet to twenty feet in depth; many of the lakes in the district are portions of ancient river beds. They are supplied by percolation and by rain-fall, and as a rule, they remain tolerably full of water all the year round. They are forty-three in number, scattered over the whole district, and they are estimated to contain an aggregate area of 139 square miles. Some communicate with rivers in the rains.

31. I do not consider these lakes in any way sources of disease, except that the water they contain often communicates a low fungoid parasitic disease to the human skin, when used for bathing purposes. They are not sources of disease because, though the water in them is stagnant, the supply is pretty

abundant at all seasons, and as they contain a fair quantity of both plants and animals, the healthy equilibrium of organised life is mantained.

32. No meteorological records were found by me on taking medical charge of Chumparun.

33. The climatê of Chumparun may be generally described as a dry one. From November to March, both months inclusive, the weather is dry and cool, the sky is often clouded, though rain seldom falls. The nights are cold and bracing, and light cool winds prevail. Fogs occur occasionally, but to no great extent, and they are not marked by the density and persistence of the fogs of some parts of Lower and Eastern Bengal. April is a moderately warm month; May is hot and dry, westerly hot winds frequently prevail, and often the absence of any breeze or shower induces a feeling of languor and oppression to European constitutions. June, July, August and part of September are rainy months, though occasionally little or no rainfalls in June, as last year. The heat is now less oppressive than in May and June. The nights are hot and disagreeable, but there is sometimes a cooler breeze from the east to temper the atmosphere, and occasional showers mitigate the oppressive severity of this season. In October the nights become less oppressive, and as the latter part of this month approaches, the weather begins to be pleasant again. I speak more particularly of the weather, as regarded by Europeans. This class does not greatly suffer in this district. Intermittent fever is occasionally met with amongst Europeans, but it is of a tractable and simple form and yields readily to treatment, seldom leaving behind it serious visceral disease.

35. The depth of wells from the surface of the water to the top may average fifteen to twenty feet during the dry season, and ten to fifteen feet during the rainy season, but in a district where wells are so numerous, very many observations will be required before a correct average can be obtained, on this point. I have given attention to this question, fully appreciating the importance, in a sanitary point of view, of ascertaining the level of what the Germans call the " ground-water" A table of well measurements is appended.

Wells are either lined with segmental tiles or with bricks, the former are more common and are ordinarily met with in villages; perhaps one well in ten is lined with bricks. Temporary (*kutcha*) wells are not used.

38. Many wells become dry in March, April and May. The drying of the wells is due to the failure of subsoil percolation water, and of subterranean springs; such failures are to be expected as the dry season reaches its height.

39. For similar reasons the surface level of well-water becomes lowered during the latter part of the dry season.

40. Tanks are not numerous in Chumparun; the existence of numerous natural reservoirs of water, and of wells in every village, rendering tanks seldom neccessary.

43. The vegetation of the district may be described as both rich and plentiful; all gardens are formed with great facility, and many fruit trees attain great luxuriance and perfection, especially peaches, grapes, *leechees, loquots* and most culinary vegetables. Enormous quantities of mango-trees are found in the district; these are by far the commonest of all trees, clumps and belts of them exist in all directions, usually consisting of trees of great age and size, which not only afford fruit and shade to a large population, but which are probably useful as a defence against malaria, if the theory which has reached us from Lancisi be true, that trees possess the power of arresting and absorbing malaria. Should trees really possess this remarkable power, the inhabitants of Chumparun are amply protected in this particular against miasma.

Blight, (*i. e.,* deficiencies from the ravages of aphides and from similar causes) has not occurred. The deficiency has been entirely owing to a want of sufficient rain.

46. The local supplies of grain are more than sufficient for the wants of the people. This is a large exporting district.

On the whole food has been moderately cheap.

Salt which is so dear an article in most parts of India, the cost of which tells heavily on the poor man, can be procured here cheaply. The poorer class, use "*puckwa*" salt, which is procured from salt-petre in every village. If this were taxed, I am assured that a large revenue would accrue to Government, probably two lacs annually.

The three principal places in Chumparun are 1, Bettiah; 2, Ramnuggur; 3, Moteeharee.

The first is the largest and most populous town in the district. Some of its streets are wide and straight and others are narrow or of moderate width. The church and burial ground of the Christian community at Bettiah are both situated in the midst of the town. The attention of the Italian Priest in charge of the Mission has been drawn to the objectionable practice of thus burying the dead in close proximity to the living, and I believe the officer in charge of the sub-division of Bettiah has ordered the Priest to discontinue this custom, and to resort to a new burial ground at some distance from the town. Bettiah is swept daily by a corps of sweepers, and accumulations of dirt are not permitted. The streets are all *kutcha*, and on each side of most of them is an irregular deep ditch. These excavations do not form part of any regular system of drainage, and do not therefore conduct the superficial sewerage to any particular point, but merely serve, I think, as cavities for the collection of dirt. Shallow permanent saucer-shaped drains would improve the sanitary condition of Bettiah.

51. The country around Bettiah is submerged during the rainy season, and more especially during July, August and September, and I do not think that this evil can be overcome by drainage.

52. The Sub-divisional Officer at Bettiah, I think, does his best to maintain the conservancy of the town, but he is hampered by difficulties. He is occupied by fatiguing and important duties in *cutcherry*, and out of it. He has no intelligent subordinates. He has no adequate apprehension probably of the importance of sanitary precautions. The Rajah of Bettiah has no knowledge at all of these matters, and the people, steeped in apathy and ignorance, only co-operate in sanitary measures when compelled to do so by the fear of punishment.

53. Ramnuggur is the next town in importance. From my report No. 103, dated February 22nd, to the address of the Magistrate of Chumparun, a copy of which accompanies this report, it will be perceived that Ramnuggur has been utterly neglected as regards conservancy arrangements. As its condition has been described in my report on the subject at length, it is unnecessary to dwell on the matter here.

54. Moteeharee is the site of the sudder station, and occupies a favourable position in a sanitary point of view. The surrounding country is dry, open, elevated and under high cultivation. It is on the border of two large lakes which supply food to the people, and its neighbourhood is never greatly submerged. Its population is small, consisting of 900 or 1000 persons, who chiefly follow agricultural pursuits, though its small bazar is occupied by sellers of grain, cloth, hard-ware, pottery and by carpenters, blacksmiths, barbers, wheelwrights and venders of liquor.

55. The streets of Moteeharee are always clean, all dirt being daily removed by sweepers, who patrol the town and its neighbourhood for this purpose.

56. The sanitary condition of Moteeharee is excellent. It is the residence of the Magistrate, of the District Superintendent of Police, of an Opium

Officer, of an Assistant Magistrate, of a Small Cause Court Judge, of the Civil Surgeon, of several subordinate native officers, and it is the head quarters of an entensive indigo concern. It is moreover, a small centre of population; it is of small area, and defects in its conservancy with so many intelligent residents are readily discovered, and where such defects are not hidden from observation by enclosures, or where they are not due to mischief and neglect in the interior of houses they are easily remedied.

A medical officer might be wisely considered for purposes of sanitation a kind of coroner, and might be instructed to investigate cases of general nuisance and of mischievous neglect, and be endowed with powers to adjudicate summarily upon such inquisitions.

59. I am not aware that any sanitary improvements have been lately proposed; none have been effected during my period of residence in the district.

60. Sickness and mortality are caused to a great extent by epidemics of small-pox, fevers and cholera.

63. I do not think that the local causes of malaria are of a nature to be removed artificially. The northern parts of the district are malarious because they border on the Nepaul Terai, and because water lodges on the surface during a considerable part of the year. This part of the country is therefore malarious because endowed by nature with certain physical characters which are irremovable by man.

65. Drinking water is obtained from wells, rivers, streams, natural ponds and tanks; chiefly from the first which are the main sources of water supply in the district and which are found everywhere. The people do not resort to marshes, ditches or puddles, but there are forty-three natural ponds in the district formerly mentioned, which contain tolerably good water and which are used as sources of supply. The drinking water is generally clear, but it often has an unpleasant taste and is very hard. I think the water tolerably wholesome. It has not been analysed to my knowledge. I do not think that the natives have a very high opinion of the water.

66. The supply of well water is usually abundant till April, when it is frequently said to fail more or less.

67. The wells are of various diameter varying from four feet to six or eight feet. They are carried to a depth of fifteen to twenty feet and are lined generally with segmental tiles, though bricks are sometimes used in the large wells.

Many wells are subject to contamination, especially where they are found among densely populated places, and where they are not protected by a coping of brick work—such protection being often absent.

68. There are no drains properly speaking in any part of the district.

69. There are rude ditches by the road side in many places, but there is no systematic attempt at drainage anywhere.

71. There are very few tanks in Chumparun, and for practical purposes they may be disregarded in considering the question of water-supply.

75. The ditches by the road side are our only drains, and except in the larger towns drains are not required. There superficial saucer drains of considerable width would be suitable. Deep *pucca* drains cannot be cleaned out unless there are means of flushing them with water which are not available here. In Bettiah and Ramnagur shallow drains might be introduced with advantage.

76. There are no well-privies or public latrines in Chumparun; private privies and the dry earth system of conservancy are not known to the native inhabitants. No trenches are dug for the reception of ordure which is allowed to remain unburied. No care is taken in the disposal of the excreta of sick persons. I speak of the general population.

77. There are accumulations of filth in many places, especially of cow and horse dung collected for conversion into manure fuel. Except in Bettiah and Motecharee no filth is systematically removed. In these places the refuse is carried and shot into holes, whither it is conveyed by conservancy carts which perambulate these places daily.

78. Hindoo corpses are burnt near any convenient lake, pond, river, or stream.

If a male, the body is placed with the face uppermost, and if a female the body is placed with the face downwards while fire is applied. Where the body is only partiallly consumed the portion unburnt is thrown into the water near which cremation was effected, and such places are frequently near human dwellings.

79. Bodies are generally buried at a depth of four or five feet, often near habitations; but I do not think that mischief would ensue from this practice except in towns like Bettiah, where, as already observed, there is a burial

ground in the middle of the town belonging to the Roman Catholic Mission. The priest has, however, been recently provided with a suitable cemetery outside the town. I think more harm arises from the universal practice of throwing bodies into rivers, streams and ponds.

83. The general atmosphere is pure and untainted; where foul odours exist they are certainly due to local filth and to the fact that the use of privies is unknown to the people.

The absence of habits of cleanliness, combined with the universal ignorance of the advantages of conservancy which prevail here, and the non-observance of the commonest sanitary precautions, are all causes which tend to produce a fitting *nidus* for the rapid development of cholera when it arrives, though science is not in a position to assume that such conditions may actually produce this disease. Similarly, foul air aided by dirt, by impure water, by a diet partly composed of raw indigestible vegetable substances, and by certain kinds of *dâl,* are causes which increase the severity of diarrhœa and which may possibly originate it.

87. The apathy and neglect of native parents added to the above causes, their unskilful nursing, their superstitious reliance upon ceremonial observance and their ignorance of material means of relief, must combine to increase the sickness and mortality of children, especially among those under two years of age—a period so fraught with danger to infantile existence.

91. Intemperance is common among the lower castes of Hindoos, but I am unable to give statistics upon the subject or to state how far disease and death are caused by it. The liquor, as originally distilled, is made from a wort of *goor* and rice mixed together. The product would be a coarse kind of rum, which would not be injurious in reasonable quantities, but the retail dealers mix *datura* seeds with the spirit with the view of increasing its stupifying powers, and this is a source of mischief which the strong hand of authority should repress.

92. Intermittent fever, usually of a mild type, is common in Chumparun. It will be seen from my Ramnuggur report that this fever occasionally attacks a large number of persons. As far as I know, this form of fever has only been epidemic in the district at Ramnuggur, though it must be said to be endemic every where. At Bettiah the chief town of Chumparun, it is met with next in frequency. This might be expected in a densely populated place, the neighbourhood of which is at certain season much submerged.

In Moteeharee, intermittent fever assumes a very mild type, leaving however behind it sometimes prolonged debility and anæmia, for which change of air is the best remedy after the periodic attacks have been subdued. I have had many opportunities of observing intermittent fever in India, particularly in Cachar and Assam, where the disease is marked by a very severe type. Compared with such fevers, the intermittent fevers of Chumparun are very mild, and I am convinced that they would be rarely fatal under appropriate treatment. In Ramnuggur an approximation to the jungle fever of Eastern Bengal was observed, and there many fell victims to the disease, but all the conditions present in that case were of a nature to favour the severity of the epidemic.

93. I have rarely observed remittent fever, the intermissions being usually complete. I can call to mind a case however in a European and some among natives where there was some hectic during the intermissions. Continued fever I have never observed at all in Chumparun.

94. The only instance of cholera which has come under my observance here was a single sporadic case in the jail. The man died six hours after admission to the hospital. He had unmistakeable cholera, though it is difficult to account for the case, no other having occurred, and it was not possible to trace it to any one outside the jail. The case was marked by very fluid watery evacuations by vomiting and collapse and by suppression of urine.

95. *Diarrrhœa and dysentery*—which are the scourges of our jails, are not absent from Chumparun, high as the healthy character of this jail stands. It is probable that all our care will not succeed in entirely freeing the jails of Bengal from these formidable complaints, as it is likely that the fact of confining large numbers of men together has in itself a tendency to foster these disorders. So much attention is, however, now paid by the Inspector General of Jails to conservancy matters in jails, as to preclude the belief that failure in this direction is the usual cause of these complaints. Chumparun is not the only healthy country where diarrhœa and dysentery are largely fatal. I have observed their frequency in some portions of the Australian colonies where infant mortality is especially effected by bowel complaints of this kind, and where faults of conservancy are certainly not common. But fatal cases here are generally met with amongst those who are approaching the end of life; though the young and robust do not always escape. Where extensive ulceration of the bowels ensues, the whole gamut of remedies may be too often tried in vain, and the patient gradually sinks in spite of all that can be done.

96. *Small-pox.*—No cases have been treated by me here; I have, however, seen a little of the disease, and know that it occurs constantly in the district. I went to a village called Kursuah on the right bank of the Gunduck in the north-west part of Chumparun, on one occasion where small-pox was said to be raging to a great extent. I examined several villages and remained some days enquiring into the matter. I only discovered fourteen cases altogether; the disease in this instance had attacked some children living in a group of huts, forming a part of the village of Kursuah When I saw them the children were recovering from what appeared to have been an attack of the discrete variety. I was informed that one child had died. In all these cases I ascertained that the children had been neither vaccinated nor inoculated. On the occasion of my visit to Kursuah, the vaccinator was with me, and we both urged the people in the neighbourhood to allow their children to be vaccinated, but without success. My overtures in this instance, as indeed has been the case often in other villages, were looked upon with suspicion and were declined. At Ramnuggur again, where I encamped for a week, accompanied by the vaccinator, I also failed to persuade the people to have their children vaccinated.

97. *Hepatitis*—Is not a common disease in Chumparun as far as my observation goes. I have seen one or two cases of hepatic abscess, and several where there was tenderness and congestion; these have been generally combined with intermittent fever. Enlarged spleen is occasionally met with, but this disease is not nearly so severe or so common as I have observed it on the north-east portions of Bengal. On the whole, I think that hepatitis and splenitis may be disregarded in a consideration of the characteristic diseases of this district.

98. One of the most prevailing diseases of this district is *bronchocele.* Women and girls are generally the subjects of this complaint, though men are sometimes attacked by it, and many have large goitres. Iodine applied to the tumour and administered internally has an extraordinary effect, as is well known, in reducing these enlargements. I think no other treatment of much use. Goitre is so constantly seen in Chumparun that cases of it meet the eye in all directions. The enlarged gland is sometimes smooth and rounded, sometimes lobulated and less frequently pendulous. I have seen no case in which it seemed to cause distress or even inconvenience. I believe that the disease is not only endemic here, but that it is inherited. Because in Europe it is generally, though not always, met with in mountainous countries, the popular belief has gained ground, that using snow-water for drinking purposes is a chief cause of the disease. Enlargement of the thyroid gland

is, however, so common in India in the plains that this explanation cannot be accepted. Again a solution of the matter has been sought in the atmosphere. A damp unhealthy climate has been thought to be the cause, I have observed this disease in Assam where it is common, and that climate is certainly damp and unhealthy. On the other hand, goitre is still more common in this district, which is extremely dry and healthy. This explanation then is not satisfactory. A disease which is so common among large bodies of people in different parts of the world, with totally different habits, cannot be due to their food. The only conclusion is that the water is at fault. A large number of persons in a village in Chumparun who were affected with goitres, many of large size and old standing, dug a new well. From the time the fresh source of water supply was used the enlarged glands diminished; tumours of moderate size entirely disappeared, and the largest were materially diminished. People came from a distance of five or six miles to obtain this water, and in their case too the goitrous enlargements subsided in the same way.

99. The water in Chumparun, as I have said elsewhere, is only of tolerable purity. It is distinguished by an unpleasant taste and is extremely hard and contains calcareous matter, which encrusts every vessel. As the exact connection between drinking water and goitre is a matter of great importance it would be interesting to have more accurate information about the quality of the water in this district than I am now able to supply.

100. I have observed above that goitre is hereditary, but I may go further and say that it is congenital, that is, that children are born goitrous. It has been considered an hereditary disease by some writers in Europe, but there the disease is seldom actually seen in children. There is a village in Chumparun called *Gayger Toleh* (goitre village) where the disease is said to be almost universal. Young and old men, women and children being nearly all more or less affected with bronchocele.

Chumparun is unfortunately not free from cretins either, they are chiefly confined, I am told, to the villages of Ownhin, Kooreah, Jadhopore, Kunchar-deria, Bullooah and Laheaar. In these villages there are said to be very many goitrous idiots, shewing different degrees of mental and physical weakness. In Switzerland the only successful remedy for cretinism has been found in change of locality. This has often produced great improvement. It is probable that a change of residence would be similarly successful here, that is in those cases where the imbecility was not of such a marked character as to be hopeless. But advice of this sort is not likely to be followed here because of the difficulty of obtaining land in a fresh locality in this district, and because of the peculiar vegetative tenacity with which villagers in this district remain attached to their own *bustees.*

103. The only epidemic which I have had the opportunity of observing in Chumparun is the Ramnuggur epidemic of intermittent fever, on which a separate report has been given, and on which, therefore, it is unnecessary to enlarge here.

There is no proper medical agency available, for the treatment of formidable epidemics among the people especially where these occur at a great distance from head-quarters.

107. When an epidemic breaks out in the district, the Magistrate sometimes requests that a native doctor may be detached to give relief to the sufferers. Such a requisition must often place a Medical Officer in a position of difficulty. If the Native Doctor at the dispensary is sent away, that institution must suffer severely during his absence. The sick must be neglected, the stores and the instruments must be left to the care of the servants, and records fall into disorder. By a recent order, no native doctor attached to a police hospital can be sent away on special duty, without a reference for the orders of the Inspector General of Hospitals, Lower Provinces. The native doctor at the jail hospital remains. On one occasion he was detached by me on special duty, though it is probable that the Inspector General of Jails would disapprove of this arrangement. It is true the Civil Medical Officer might go himself to the village where disease was rife, and on three occasions I have done so, but arrears of work accumulate, and a return to head-quarters is rendered necessary.

108. The native doctor at Bettiah, was lately despatched into the mofussil by the sub-divisional officer, without my knowledge, for the purpose of giving medical relief to a village, but this involved leaving the Bettiah dispensary and lock-up without a native doctor. No useful efforts can be made then, I think, to relieve or arrest epidemics among the people, while the medical establishments are only just sufficient for government hospitals, even were there a superfluity of native doctors of the calibre I have described, I am convinced that they could do little good in attempting to cope with such a formidable epidemic as cholera.

109. In such cases, in order to act with the best chances of success, I am persuaded that the executive medical officer of the district should go himself to the infected locality, accompanied by a native doctor, dressers and sweepers.

He should be in a position to depute his medical duties at head-quarters to a Sub-Assistant Surgeon, or to a native doctor with a good knowledge of English and well qualified professionally. The jail duties of the medical officer can be easily delegated to a Magistrate.

110. Supposing this done—under existing regulations, however, a medical officer on arriving at the seat of an epidemic finds himself powerless, except to make enquiries. He is looked on coldly, and with suspicion perhaps by the population, who may evince no willingness to meet his suggestions. He has no authority to enforce the rapid removal and burial of the dead, or to prevent bodies from being thrown into streams and ponds. The interiors of houses are sealed to him, and his suggestions that *excreta* shall be quickly taken away, deodorised, and buried in trenches, are probably passively ignored or actively opposed by a population ignorant of the advantages of such precautions. Even a hint that fumigation by sulphur would be useful in all the houses of the affected villages is hardly likely to be adopted. In short the power to act is not conferred upon him.

111. This power should include the command of a certain sum of money which might be spent, at his discretion, in building temporary hospitals, in the payment of sweepers and dressers, and in the purchase of any neccessary drugs or stores. I would suggest that he should be instructed to engage the services of the leading men of the village on the side of discipline, cleanliness, and conservancy—to engage them by payment, and to retain them as auxiliaries by conciliation and kindness. I should be inclined to rely as little as possible on the police, and to form a sanitary corps out of the villagers themselves, assisted perhaps by the chowkeedars. I am afraid that the police are often looked upon with distrust by the people, who are sometimes oppressed by them.

FAIRS.

117. The following fairs are held at Chumparun. A fair is held at Arraj Mahadeo in March, and is attended by 1,000 persons, besides some 200 shop-keepers and traders. The fair of Adapore is held in the month of April; it lasts five days, and is attended by 9,000 people, and traders to the number of 170. The other fairs are Bettiah, Treebenee, and Baggharajhatta, and may be attended, respectively, by 8,000, 6,000, and 600 persons. Many petty fairs are also held in the Chumparun District, of which it is unneccessary to take particular notice. I have no personal knowledge of these fairs, Bettiah excepted, or of the places where they are held, or of any sickness which may have occurred on any of these occasions.

118. Vaccination and inoculation are very important parts of a sanitary report on Chumparun, where small-pox is a very common disease and while the preventive means at hand are slight—almost useless.

120. In the Chumparun District, a single vaccinator is employed, who this season vaccinated some 107 cases. Sometimes those operated upon have been brought to me for examination, but in the greater number of cases this has been impossible, as the vaccinator has been sent out into the district alone.

121. On the occasion of my visit to Kursuah, mentioned above, the vaccinator was with me, and we urged the people in the neighbourhood to allow their children to be vaccinated, but, as I have observed, without success. My overtures in this instance, as indeed, has been the case, often, in other villages, were rejected. At Ramnuggur, again, where I encamped for a week, accompanied by the vaccinator, I also failed to persuade the people to have their children vaccinated.

122. The attempt to check small-pox to any appreciable extent by employing one or two vaccinators, in a large district like this, I am sure must fail, as a prophylactic measure, under any system. If we wait until education has permeated the masses and given them a higher intelligence, a very long and indefinite period must elapse before we can endow this country with the benefit of Jenner's discovery. Even highly increased intelligence would be inadequate to do this thoroughly, judging from countries distinguished by the highest civilization, where it has been found necessary to enforce vaccination by legislative enactments. Such a plan can be also adopted in India, but the application of the laws to the subject of vaccination should be gradual though steadily progressive.

124. The real nature of vaccination, the history of its discovery, its harmless character and its protective virtues should be systematically explained in all schools receiving State aid, and the vaccination of all the pupils should be insisted upon as the best commentary on the text. The children would teach their parents and relations what they had learnt concerning an operation no longer mysterious and no longer therefore to be dreaded. The name of Jenner would be spoken in a million homes of Asia, and when unhappily an epidemic of variola should happen, the bigoted and the sceptic, seeing the immunity enjoyed by those who had submitted to the lancet of the vaccinator, would acknowledge, perhaps with reluctance but certainly with sincerity, that their opposition had been foolish.

In Chumparun there is one vaccinator (a Brahman) on a salary of ten rupees a month, and I believe he is as good a man as can be obtained for such a pittance, but I am conscious that his efforts have resulted in but little good.

129. I think as an abstract question that though an efficient quarantine would tend to check many contagious diseases, that it would be impossible to surmount the practical difficulties which surround this matter. It might be possible, in some cases, to prevent travellers from entering a town if they were known to come from an infected locality, and to compel them to take another route, but it would be impossible to prevent all access to any particular place, or all egress from it, without the adoption of extremely harsh measures, which would certainly cause much dissatisfaction and annoyance to those whom it was intented to protect. If such functions were entrusted to the police, an enormous power of oppression would be given to them, which it is to be feared they would frequently use to the injury of the people. A quarantine to be really preventive must be complete, and I very much question if an efficient blockade of this kind can possibly be maintained in an open country.

130. Where a natural boundary intervenes, such as a broad river, or where a pass exists separating plains from mountains, it might be possible to prevent communication, but in the case of the towns and villages of the plains of India, inter-communication could only be stopped by harsh measures.

131. I conclude this report in camp at Bettiah where I am actively engaged in carrying out measures for the relief of cholera. The question of affording relief in epidemics of this and other diseases has been touched upon in former paragraphs of this report. I was never so thoroughly impressed with the difficulties which beset this subject, or so clearly understood them as now. I find that the only possible way of getting at the sick is to visit them at their own homes, and not reposing great confidence in the only native doctor who is here to assist me, I have preferred to undertake this duty personally, but though my health is pretty good, I find this to be a very laborious and trying undertaking at this season of the year. I have said above that my experience of native interiors was confined to a few houses only, which I had visited professionally. My experience in this matter is no longer thus limited as I have lately seen very many native houses in Bettiah; and have entered the inmost *penetralia* of the poorest classes, and have thus paid several hundred visits in the course of my daily rounds. The squalor, filth, and misery in which the poor of Bettiah live can only be adequately understood by those who have acquired like experience, by similar personal

contact with the sick poor of this country in their own homes. I am persuaded that unless our sanitary improvements can reach native interiors where filth is chiefly concentrated, that it will be of comparatively little use to keep the streets of a large town clean.

A European Inspector of Police attached to the Bettiah Sub-division, who is an intelligent man, accompanied me on the first occasion of my rounds through this town; but he manifested such horror and disquiet and even dread at the scenes with which we were brought into contact, and desired so earnestly that he might be excused from this duty, that I was afterwards obliged to go alone, that is, merely accompanied by a constable who pointed out the houses of the sick, and by a native doctor who gave them medicine in accordance with my orders. I am the only Englishman probably who has ever seen the interiors of the poorest class in Bettiah. I am not at all surprised at the Inspector's wish to shrink from the task of being my *cicerone*, as those interiors are certainly extremely repulsive.

No one, unless encouraged by a desire to relieve the distress of suffering multitudes, and by the hope of arresting the decimation of a dense population by a disease equally swift, fatal and mysterious, could perhaps be expected to face such scenes of wretchedness; I am glad therefore to have had this opportunity of obtaining an enlarged experience on this matter, and I am consoled for my efforts by the belief that, humanly speaking, my visits have resulted in some good.

If the Inspector's reluctance to accompany me may be regarded as typical of a general feeling amongst the European members of the police force, correct information on these subjects is only likely to reach Government through its medical officers. This is perhaps not surprising as laymen can hardly be animated by that spirit of professional intrepidity which sustains those alone who have been trained from early life to combat pestilence and death.

37.—MIDNAPORE.

THE REPORT IS BY DR. BEDFORD ALLEN.

I. Midnapore—*Latitude* 22° 24′ 17″ *North.*—*Longitude* 87° 17′ 53″ ***East.***

III. Undoubtedly very healthy.

IV. The removal of jungle, and the cultivation of waste lands has reduced the prevalence of jungle fever.

" No reliable statistics available from which such a table could be drawn. I am of opinion, the year under review was the healthier.

Leprosy not so prevalent as in other districts; elephantiasis is common.

X. There has been no exceptional sickness.

XI. During the rains, and at the commencement of the cold season, disease is more prevalent in the station.

The jail has been very healthy, the ratio per 1,000 of sick to strength, is 1·6, and of mortality to strength, ·05.

The Police Force was also healthy, until ordered on duty to Keonjhur, in the middle of jungle, where they passed the rainy season. A large proportion of the force was laid up with fever, spleen, dysentery and diarrhœa.

The ratio per 1,000 of sick to strength, 3·7.

Ditto of mortality to strength, 1·9.

XIII. Healthy, fit for work, industrious and thrifty.

XIV. Midnapore Town 35,000, this is thought to be below the mark.

MEN.	WOMEN.	CHILDREN.	TOTAL.
30·6	35	34·4	100

The population is agricultural and thriving; there is some emigration to Assam and Sylhet but not large.

Population of the district is estimated at 1,200,000 an average of 400 to the square mile. On the cultivated area, the whole district contains 4,836 square miles, of which 2,924 square miles are uncultivated. It is thought this estimate of the population is considerably below the truth."

TOPOGRAPHICAL CHARACTERISTICS.

Slope of country, to the east and south of Midnapore.—At a radius of from twenty to twenty-five miles, the country falls to the level of high water of spring tides, the rate of slope varying from three to five feet per mile. In the station of Midnapore the fall from the European quarters to the river is about forty feet on the average—the river being one and a half mile distant.

" At Midnapore the subsoil water is found at from forty to sixty feet.

"The natural drainage of the country is effected by the numerous *khâls* which exist to the south of the Kossye, between Midnapore and Panchkoorah."

It can hardly be said that irrigation is dependent on the canals or rivers, because artificial irrigation of any kind is so sparingly resorted to ; about 4,000 acres only have been irrigated from the canal works completed. The people are in places familiar with *bunds* across the river, and drainages for the purpose of irrigation, but not extensively so.

The *khâls* in and about the station require careful supervision, as well as some small shallow tanks. The state of these is decidedly in a more or less degree prejudicial."

METEOROLOGY, CLIMATE, &c.

" A copy of the meteorological statistics as kept during the year, is herewith appended.

The observations were taken at the jail hospital under my superintendence, the constant showers in April and May, rendered these months unusually cool and pleasant. The heavy rains and floods in June and August inundated portions of the country, and the entire cessation of the rains in October has been followed by a mild cold season up to the end of the year."

Meteorological Statistics—Midnapore.

MONTHS	6 A. M.												10 A. M.	
				DRY BULB.		WET BULB.					WIND.			
	Barometer No. None Reading.	Attached Thermometer.	Corrected for Index error, capillary action and to temperature of 32°.	Thermometer No. 2419.	Corrected reading for Index error.	Thermometer No. 2479.	Corrected reading for Index error.	Temperature of dew point computed.	Elastic force of vapour.	Humidity.	Direction.	Force in lbs. per square foot.	Mean in air Dry Bulb.	Mean in Wet Thermometer.
	°	°	°	°	°	°	°	°						
January 1868	30·21	73	... .	....	..... .	....	....	....	....	....	N.-W. ...	....	69	......
February „	30·21	77	....	....	....	....	... .	....	....	....	N.-W. ...	....	......	......
March „	29·65	94	29·779	70	70·2	66	66·3	67·8	·637	·843	S.-W. ...	....	81	32
April „	29·85	82	29·763	76	76·2	76	76·3	74·4	·456	·942	South ...	47-2-8	88	......
May „	29·65	81	29·701	77	77·2	75	75·3	73·24	·830	·664	South ...	14-27-2	161	72
June „	29·58	81	29·487	80	80·2	77	77·3	73·8	·869	·833	S.-W. ...	14-11	109	73
July „	29·64	82	29·530	74	74·2	76	76·3	79·	·881	·903	S.-W. ...	19-3-3	105	76
August „	29·65	80	29·541	79	79·2	76	76·3	77·	1·162	·858	West ...	13-15-9	101	75
September „	29·74	81	29·632	80	80·2	77	77·7	75·5	·883	·850	West ...	15-32-6	102	77
October „	29·65	79	29·834	72	72·3	69	69·8	69·7	·412	·851	West ...	21-10-8	102	84
November „	30·02	71	29·559	56	56·2	57	57·3	55·8	·441	·844	West ...	83-34-4	99	80
December „	30·12	65	29·135	54	54·2	52	52·3	48·5	·347	·760	N.-W. ...	13-44-80	93	74

Meteorological Statistics—Midnapore.—(Continued.)

MONTHS.	4 P. M.												
				DRY BULB.		WET BULB.					WIND.		
	Barometer No. None Reading.	Attached Thermometer.	Corrected for Index error, capillary action and to temperature of 32°.	Thermometer No. 2419.	Corrected reading for Index error.	Thermometer No. 2479.	Corrected reading for Index error.	Temperature of dew point computed.	Elastic force of vapour.	Humidity.	Direction.	Force in lbs. per square foot.	Rain-fall.
	°												
January 1868	30·02	66°	....	....	....	....	....	....	....	....	North-West ...	....	0·1
February „	29·95	74	....	....	....	....	....	....	....	....	North-West ...	....	....
March „	29·89	87	29·727	91°	91·2	74°	74·3	63·9	·625	·408	West ...	....	0·1
April „	29·85	93	29·637	95	95·2	78	78·3	63·6	·730	·441	South ...	7-51	5·6
May „	29·12	91	29·610	91	91·2	72	72·3	64·45	·549	·482	South ...	71-64	3·6
June „	29·35	86	29·455	87	87·2	80	80·3	79·4	·491	·770	South-West ...	58-2	22·75
July „	29·56	83	29·451	87	87·2	82	82·3	81·4	1·033	·982	South-West ..	521-7-4	5·4
August „	29·59	85	29·481	86	86·2	81	81·3	78·2	·960	·771	West ...	96-27-7	19·9
September „	29·68	85	29·560	82	82·2	79	79·3	76·8	·935	·755	West ...	11-043	13·2
October „	29·89	84	29·721	86	83·9	70	75·1	74·4	·864	·672	North-West ...	523-680	1·3
November „	30·02	78	29·785	80	80·2	70	70·3	64·2	·601	·558	North-West ...	571-630	....
December „	29·12	72	29·628	76	76·2	67	67·3	61·5	·559	·604	North-West ...	808-120	....

Total Rain-fall 71·95 inches.

"The climate of Midnapore is dry and salubrious; moisture is rapidly absorbed, it resembles the Behar climate, and I consider it one of the healthiest stations in Bengal."

IRRIGATION, CROPS, WELLS, &C.

"In the north and west part of the district, where the laterite soil is found, wells and tanks are about equally common. The wells being dug through the laterite, are naturally *pucca,* their depth depends upon the thickness of the laterite stratum, as no water is found till the clay, which underlies the laterite is reached. In the rest of the district tanks are commonly used.

The main crop is the *amun* rice, harvested in December. The approximate area under cultivation of different kinds is as follows :—

Aous rice,	240	square miles, principally in the jungle mehals in the west.
Amun rice,	2,319	square miles.
Other good crops,	183	square miles. (pulses, &c., sugar-cane.)
Crops not for food,	182	square miles (oil seeds, cotton, indigo.)
Total	2,924	square miles.

Estimated yield of an average year is—

Auman rice	2,96,83,000	maunds of paddy.
Aous rice	24,58,000	,, ,,

Yielding maunds of husked rice, the former 1,41,00,000 maunds :—
Ditto Ditto the latter 11,52,000 ,,
Total 1,52,52,000 ,,

Taking the whole district, the yield of this year has probably not been more than one-half of this.

Food is cheap.

The produce has been an average year.

No blight has occurred."

SANITATION, CONSERVANCY, &C.

"I would suggest the sectionizing of the town into divisions, say twelve; the municipal corporation consisting of that number, a division might be placed under the control of each Commissioner.

" Drinking water in the town is mostly taken from the rivers and wells, the water in the latter is considered decidedly good, as a rule the people do not use impure water for drinking purposes.

The drinking water of Midnapore is good and wholesome, I am not aware that it has been analyzed. The natives speak of it as sweet and good.

The drinking wells are *pucca,* upwards of sixty feet in depth, cleansed when occasion requiries, not as a rule.

Surface drainage passes into most of the tanks. None of the wells are protected by grating, save those in the jail or belonging to Europeans. The wells are never cleansed systematically in the moffussil. 119 tanks have been registered as set apart for drinking purposes only, (this was done in February 1868).

The survey statistics are based upon the assumption that five is the average number of inmates in each dwelling, but this is far too low an average."

"A proper survey and level of the town is required, with systematic drainage.

No well privies exist at Midnapore, neither are there public latrines, or urinals. The private privy, in general use, is a small room, in the corner of the house with a trap-door outside. Dry earth is not used except in the jail, where only trenches are also used.

The refuse swept up by the municipal carts is used to fill in excavations or more commonly thrown into the *khál,* to be washed away in the next season.

The preparation of hides is a common trade, and I know of one in the vicinity of dwellings in the Hubbeepore Division of the town, which the inhabitants complained of as a nuisance, and which should be removed."

UNWHOLESOME LIQUORS.

"The only class of people who have a character for being intemperate are, I believe, the Sonthals, they drink a spirit distilled from rice (called *Handreea*) which is said to be very unwholesome; people in general are not great drinkers to judge from the excise returns."

SPECIFIC DISEASES.

" *Fever.*—Prevailed endemically in the station and district throughout the year 1868, especially in the months of October and November. They were principally intermittent, quotidian, and bilious remittent.

Cholera.—Prevailed epidemically in the interior of the district; a return of numbers as reported by the police, is herewith appended. A short outbreak occurred in the station, commencing about the end of February and continuing till the end of March, or first week in April; the disease was brought into the station by the pilgrims, on their return from Juggernauth. On the 12th April there was a heavy shower of rain, preceded by a strong wind from the north-west, and another fall of rain on the 16th April, accompanied with much electric disturbance, and the evolution of a large quantity of ozone, when the disease ceased.

No cholera has occurred in the jail during the year."

Statement showing the number of attacks and deaths from Cholera during the year 1868, *in the Midnapore District.*

NAME OF THE POLICE STATIONS.	ATTACKED.												DIED.											
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Salleunee	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...
Kespore	...	...	5	21	...	...	...	...	...	...	7	...	...	...	4	12	...	...	...	...	...	...	7	...
Narain Ghur	...	...	11	23	2	10	7	...	...	...	16	13	...	...	11	23	1	10	6	...	...	...	9	11
Daspore	...	...	5	22	11	2	11	4	10	38	5	1	...	...	5	22	11	2	11	4	10	36	5	1
Gurbetta	...	...	...	4	2	1	2	...	...	...	...	...	...	...	...	4	2	1	2	...	...	...	...	...
Midnapore	...	...	4	52	4	...	1	...	...	...	1	...	...	...	3	50	4	...	1	...	...	...	1	...
Debrah	...	...	3	18	1	18	...	...	15	...	...	...	...	...	3	15	1	15	...	...	...	...	11	...
Datoon	...	...	36	49	1	2	3	...	...	9	2	...	...	...	32	49	1	2	3	...	...	...	9	2
Jhargam	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gopeebulubpore	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Beenpore	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Subbung	...	50	83	46	11	2	4	2	6	39	26	6	...	42	69	45	11	2	4	2	6	37	28	4
Nundeegram	..	3	7	164	36	11	5	...	...	...	15	...	...	2	6	99	24	7	2	...	...	10	...	...
Muslundpore	...	...	...	73	3	1	...	...	...	...	...	...	...	...	...	37	2	1	...	...	...	...	...	...
Tumlook...	...	27	83	57	...	...	...	...	...	...	...	...	...	24	49	46	2	2	...	...	...	1	4	2
Paunchkoorah	...	16	11	22	2	...	...	17	1	28	4	3	...	16	11	13	2	...	...	17	1	28	4	3
Sootahatta	...	...	3	6	1	2	...	...	2	...	...	...	...	...	3	6	1	2	...	...	2	...	...	...
Contai	7	14	19	13	...	...	...	...	...	...	...	...	7	7	13	13	...	...	...	...	...	...	...	...
Roghoonathpore	...	...	48	5	...	...	...	...	...	...	...	...	...	...	32	7	...	..	...	...	...	...	...	...
Kedgeree	...	...	...	...	3	6	...	...	...	...	...	...	...	...	...	...	2	3	...	...	...	...	...	...
Agrah	...	...	11	6	1	16	...	...	...	...	14	5	...	...	10	6	1	12	...	...	...	...	12	3
Pataspore	...	...	46	27	...	...	...	...	...	...	...	...	...	...	26	20	...	...	...	...	...	...	...	...
Bhagwanpore	...	...	...	11	10	...	...	...	...	...	...	11	...	...	...	11	10	...	...	...	...	...	...	7
Total	7	110	375	619	90	71	33	23	19	114	105	39	7	91	277	461	77	59	29	23	19	112	88	33
	Total 1,605												Total 1,273											

Diarrhœa—was endemic in the station in the months of March and April, and a few sporadic cases in the month of August. The most common variety was bilious diarrhœa. This disease affected mostly those persons who were exposed at night, or who lived intemperately.

Dysentery—neither occurred as an epidemic nor endemic, the cases treated at the charitable dispensary consisted for the most part of pilgrims, either going or returning from Juggernath, who as a rule sought medical aid too late.

Small-pox—did not make its appearance in this station or district, either in an epidemic or endemic form.

Hepatitis—is a common disease in the station and district, especially that variety of the disorder known as biliary congestion and frequently complicated with remittant fever.

Whooping Cough—prevailed endemically in the station and parts of the district."

STATISTICAL RECORDS.

" I can furnish no useful statistical records regarding rates of sickness and mortality of any of the diseases above noted, with the exception of that of cholera.

The Police Return shews that 1,605 cases were reported in the district during the year, out of which 1,273 died, showing a mortality of 79·32 per cent.

The Sub-Assistant Surgeon reports three cases of relapsing fever in the year as follows: "One in my own house, a very typical case, characterized by the following symptoms, viz., rigors, severe headache, delirium at times, a very rapid pulse, 138 to 144 in a minute, heat and dryness of the skin, aching of back and limbs, high-coloured urine, looseness of the bowels at the commencement, followed by costiveness, loss of appetite, the tongue, coated with a thick whitish fur, epigastric tenderness, and bilious vomiting; the fever continued unabated till the 7th day, when it left with a copious perspiration, pulse 96, and convalescence took place, the fever returned on the 14th or 15th day, and returned a third, fourth, fifth and even a sixth time at intervals of about a fortnight.

The second case, a lad aged nineteen years, attacked with fever, characterized by almost all the symptoms described in the preceding case.

A third case, nearly similar—no cause can be assigned, they were not contagious."

EPIDEMICS.

" *Cholera*—is said to originate in this station with the pilgrims who in considerable numbers journey to and from Juggernauth.

In 1866 and 1868 it is reported to have commenced at the sea coast, sub-divisions Contai and Tumlook, and travelling northwards visited Midnapore, and north-west, visited the Thannahs before mentioned. The dates of the appearance of cholera have been as follows :—

In 1860. March and June.
„ 1861.* March.
„ 1863.* September and October.
„ 1864.* February and March.
„ 1866. February and June.
„ 1868.* March and April.

(The asterisk signifies that epidemic cholera did not visit the jail, or only in a very mild form.")

In Moyna Chowra it was most virulent, the inhabitants having no intercourse with those suffering from the disease.

Diffusion by human intercourse has been indicated by the appearance of the disease simultaneously with an influx of pilgrims.

As precautionary measures, &c., I would suggest quarantine regulations ; removal to a healthy spot ; attending to sanitary and conservancy arrangements ; fumigating ; cleansing, and deodorizing vacated buildings.

Small-pox.—It is reported that a fearful epidemic occurred in October 1866 to February 1867, became less severe in March, disappeared in May ; occasional cases were seen up to December. Thousands were carried off. The disease raged principally among the famine-stricken, and had its origin from the small-pox inoculations, carried on by the Brahmins, who followed the practice to a considerable extent, and although vaccination is widely practised, and much appreciated, yet instances are known of the people of the station resorting to inoculation. The following are the sequelæ of the disease, from notes kept at the charitable dispensary :—

6	cases	Ulceration of Cornea.	1	case	Anchylosis.
2	„	Staphyloma.	1	„	Synovitis.
4	„	Abscesses.	1	„	Aphthæ.
3	„	Ulcers.	1	„	Dysentery.
2	„	Scabies.			

There is one point which I would urge, viz., that attendance and treatment be promptly supplied when an outbreak is reported. Local funds should be raised at most stations for the entertainment of two or more travelling native doctors; useful work could be found for them, when not in the district ; means should be at hand to provide temporary hospitals for those attacked.

Prejudice against vaccination is considerably on the decrease, it is much appreciated in the town and in many parts of the district, but inoculation is still practised to a considerable extent.

On an outbreak of cholera or small-pox, I am of opinion, that patients should be removed from the locality in which the disease prevails, that quarantine and cordon regulations should be enforced, and that pilgrims should not be permitted to visit the town, but be located at a distance."

NATIVE PRACTITIONERS.

" There are about twenty *boids,* seventy-four *kobirajes,* and eighteen *hakims* practising in the town and district. The *boids* and *kobirajes* invariably advise fasting in the first stage of fever ; in the second, fried rice, sugar-candy and vegetables; cold water is never allowed, but boiled with aniseed, and given in drops if the thirst is very violent. In heaviness of head, dry fomentations, by means of earthen pots heated and held over and around the head until perspiration is produced. Decoctions of vegetable drugs are given from the 3rd or 4th day of the illness; if the fever does not leave in 10 or 12 days, quinine is usually resorted to.

In ague they give arsenic in sugar, and snake poison is employed when the fever assumes a typhoid character; musk is also administered in sub-acute or chronic fevers. Mineral drugs are given, and those which contain gold are considered useful.

Preparations of *teel*-oil and clarified butter are also used. When all other remedies fail, a peculiar preparation of gold and mercury called *mokurdhuz* is the only medicine prescribed.

The *hakeems* employ the seeds of vegetables and a number of European drugs, give cold water and nourishing diet."

EPIZOOTICS.

" A disease amongst the cattle called *mattha* is now said to have prevailed in the district during the past month, but is on the decline. I sent the vaccinator out to see and report upon it, and collect some lymph, but they say the animals appear drowsy and weak, and foam at the mouth, but no vesicles are apparent on any part of the body, and many die."

38.—BALASORE

REPORT BY DOCTOR J. DAVIES, CIVIL MEDICAL OFFICER.

Balasore.—*Latitude* 21° 30′ *North—Longitude* 87° *East.*

III. " I am of opinion that the town of Balasore is equally favorable to the health of the natives and Europeans. The former enjoy an immunity from fever, intermittent, remittent, and continued, dysentery, diarrhœa, and cholera, that compares favorably with other stations in Bengal. Europeans of average constitution are as a rule healthy.

The district generally is of the same healthy character, with the exception of Dhamra, the swampy tract of country on the coast, about sixty miles south-south-east of Balasore ; this place is a perfect hot-bed of a malarious non-infectious fever of a low and persistent kind.

The banks of the tidal river from which it takes its name are not high enough to prevent inundation in the high spring tides.

The poisonous air only awaits a southerly wind to carry its malaria to some considerable distance inland.

IV. I am told both by natives and Europeans of experience, that there have been marked improvements in the sanitary condition of Balasore during the last twenty years, in fact since the completion and occupation of the new town and bazaar. Old Balasore was situated about half a mile south of the present town. The principal street was narrow; the houses were irregularly built; there was little or no supervision exerted by the authorities; accumulations of filth of all kinds were left to the option of the natives to remove or not; cholera was endemic and the mortality both from it and fever was high. The worst cholera year on record was 1841, when it was present for eight months in the Balasore Jail. The site of the present town and bazaar is on higher ground, the streets are wider, and the market and drains are both looked after. The tanks are kept clean, and, as a consequence, the general health is better. Notwithstanding all this there is much room for improvement.

VIII. The only disease peculiar to this district is elephantiasis.

Leprosy is occasionally seen in the inhabitants, but more frequently in pilgrims from the North-West. Elephantiasis appears to have geographical limits; thus while it is exceedingly common near and on the coast and low-lands, it is very rarely seen near the neighbouring hills. From the limited statistics I have been at present able to procure, I gather the following:

1st. That it is hereditary, this even to the peculiar part affected in parent and offspring.

2nd. That the subjects of it, both prior and subsequent to the appearances of the disease, are more prone to attacks of fever and ague than other individuals.

3rd. That it affects equally, in order of frequency, Mussulmen and Hindoos, males and females.

4th. That it is almost exclusively confined to the extremities and in both sexes, the left leg is more commonly the seat of the disease than the right.

5th. It does not appear to shorten life.

Rheumatism and pulmonary diseases are said to be very rife in the cold weather, my experience of only a year does not confirm this.

XIII. The people as a rule are healthy-looking, all the sickly and aged died out in the famine of 1865-66.

They are as a body poor in circumstances, owing to the famine of 1865-66, but from the way they are re-building their houses, and tilling land which has lain barren since the famine, it is evident they are slowly recovering, and a succession of good crops for a few years will restore them to their original prosperity.

The Ooriah Mussulman is a better style of man, both mentally and physically than his Hindoo brother, his superiority being apparent in various ways. The site of his house is better chosen with a view to its dryness, it is better situated, and his sleeping apartment is more spacious; again in his gardens and fields his energy in time of drought in irrigating his land is apparent to all who have travelled in the mofussil.

Generally, Balasore is improving as regards the health of its inhabitants, who are, as a race, one of the most prejudiced in India."

TOPOGRAPHICAL CHARACTERS.

" Balasore is about fifteen feet higher than the flood level of the river.

Due east is salt marsh, jungle, and the sea, and at about this point the river Boorabollong falls into the sea. The nearest point on the coast bears about south-east of Balasore, at a distance of eight or nine miles. The country to the east, and about two miles distant, is low and swampy, and in this direction there are one or two large *khâls* of no great depth. None of these are regarded as the sources of disease, perhaps from the reason that during the time of drying up, the wind is steady from the north and north-west, and any malaria that may arise is carried over uninhabited country to the coast."

METEOROLOGY, CLIMATE, &c.

" The only peculiarity in the seasons of the past year (1868) occurred in the rains. The unusually heavy fall of rain in the month of June, and the scant fall in September and October are both remarkable.

Had it not been for the subsequent drought in September and October, the crops would have been quite equal to the average.

The hot season commences in March, and with it we look for the advent of cholera which occurs first among pilgrims, shewing no partiality either for the stream going to, or returning from Pooree. Both among pilgrims and residents the amount of drought in the season visibly affects the number attacked and the severity of the disease. In the month of March 1868, sporadic cases occurred in different parts of the district, and in one village assumed an epidemic form. This was at a time when cholera was very prevalent amongst pilgrims on the Trunk Road. I am of opinion that there was no connection between the two, for the village attacked was at a considerable distance from the Trunk Road, and as far as I could learn it was quite out of the way of pilgrims, and was not visited by any of them on the occasion of this outbreak.

The health either of Europeans or natives is not affected until August and September. In the former month, intermittent fever of a tractable type is common. Dysentery is also rife, especially amongst natives of Bengal. The Ooriah strikes one as peculiarly exempt from it, how much this is due (or if at all) to his habit of opium-eating I am not in a position to say. The diseases one would naturally expect to find in a damp climate, such as neuralgia, rheumatism, ague, intermittent fever are rife during and after the rains.

Proportion of cultivated lands.	Waste uncultivated.	Cultivated.	Total.
769·29	799·544	142·97	1,711·80

Wells are not used for the purpose of irrigation, tanks are very numerous, in and about Balasore, but not so numerous in the district.

There is no Municipal Committee, and there ought to be one, for I firmly believe that endemic cholera could be stamped out if sanitary recommendations were carried out.

The supply of drinking water is derived from tanks, river, and wells. The European source of supply is a well in the *kutcherry* compound; the quality of the water is excellent, as is all the well water at Balasore, probably because it is not fouled, from the wells being generally covered up after water is drawn. The character of the tank water varies.

In the district tanks are not numerous, and in seasons of drought great risk to the public health occurs from the ryots nearly emptying the tanks for the purpose of irrigating their land, then the drinking water is fouled and people are compelled to drink muddy water. The scarcity is most felt from January to April, and this is the season for cholera *par excellence*."

"The average number of people in each dwelling room is four or five. The measurement of an ordinary day and night apartment of the poorer classes gave the following result: Length of room ten feet, breadth seven feet, and height eight feet. A hundred cubic feet is about the average amount of air enjoyed by each pair of lungs.

Trenches are not dug for the reception of ordure. The greater part of the excrementitious matter of the poorer people is simply deposited on the surface of the ground. The *excreta* of the hospital patients are buried with due care.

(*f.*) The Hindoos burn their corpses in two places, one in the west of Balasore and a mile distant; and the other east and distant about a mile and a half; it is carefully done and is not a source of inconvenience to any one.

Criminal abortion is frequently resorted to. A certain class of native *Dhayees* procure their livelihood by it; the common plan is to introduce a sharpened pencil-shaped piece of wood into the uterus. Another method, not so common perhaps, because it is more frequently followed by death, is the internal exhibition of decoction of *Nung-nunglea* root-stock. The shrub is common in all the jungles; it bears a small red flower. The natives take it up in June, before it flowers, and exhibit it either in the form of decoction, or powdered, and given in curds of milk with a little sugar. An over-dose causes frightful spasm and tetanic symptoms generally; I intend to make some experiments with it, and will forward the results in due time. *Nung-nunglea* root-stock powdered and boiled with oil is used by the bazaar *hakeems* as a remedy for ring-worm."

EPIDEMICS.

"The worst cholera epidemic that has occurred at Balasore for some years was in the early part of 1866. The following account of it is from the Notes of Doctor Jackson, the Resident Medical Officer.

The epidemic was first heard of in the northern part of the district in January. In February it was raging in the town of Balasore, and appeared in the jail. The year 1865 was remarkable for a small rain-fall, during the year, 52·60 inches were registered; but of this thirteen inches had fallen in January, February, March and April, out of season as it were, and the actual fall of rain during the season of cultivation was 39·60.

"In the month of June there were only 4·25 inches, and in July six inches, in August and September eight and nine inches respectively, and in October only 0·310 inch; from the 12th October to 20th January there was actually no rain. In January 1866, one inch fell; in February 3·25 inches, and in March none. (Even as early as January 1865 many tanks were observed to be unusually low, and in April, tanks all over the district which were never known to fail before were perfectly dry.)

The mean temperature in 1864 was 80·3° with a thermometric range of 57° and barometric range of 0·705 inches. That of 1865 was 80·7°, but with a thermometric range of 47° only, and barometric range of 0·835. The highest temperature in the shade in 1864 was 105° and the lowest 48°. The former in April, the latter in January. In 1865 the highest temperature was 102° in May, and 55° in December.

In 1864, 64·5 inches of rain fell, nearly sixty inches having fallen from May to December inclusive, against only 39·55 during the same period in 1865."

During the months of February and March 1866 the principal meteorological feature has been the remarkable daily disturbance in the barometer without apparently any result either in wind or rain.

In February this was the case to a cerain extent, but in March much more so; during February 1865, the total barometric range was only 00·21 inches; in February 1866 it was 00·30 inches; in March 1865 it was 00·16 inches; in March 1866, 00·335 inches.

The above points to drought as one of the predisposing causes of cholera, and especially in a district where cholera is endemically present.

Since my arrival in this district in October 1867 my experience of cholera has happily been confined to sporadic cases occurring amongst pilgrims. In my own opinion the predisposing cause is drought. This is borne out by the fact that it is most prevalent from March to July inclusive. The exciting causes are probably the long fast and fatigue endured by the pilgrims, the unwholesome uncooked food, exposure to the mid-day sun and to the heavy morning and evening dews.

Such pilgrims are admitted into hospital collapsed, and often unconscious and moribund.

VACCINATION.

Vaccination is performed by two especially appointed vaccinators, Brahmains of high caste. Statistics on this subject are not reliable; the prejudices of the people have, to some extent, been overcome. A great drawback to the efficacy of the operation, is their only allowing one insertion on each arm; they do not believe in re-vaccination. The majority of the adults one meets have only one mark; this is not giving the protective power of vaccination a fair chance.

The people of the town are becoming too civilized to allow inoculation, but in the district of Balasore it is still practised. I have just received a report from the District Superintendent of Police, that fourteen children in one village, some forty miles from here, have died from inoculation, and several other children are sick. I visited this village, and although there was proof of the children having been inoculated, yet the fact of their having died on the same day, of purging, and vomiting was almost conclusive that cholera, and not the effects of inoculation, had caused their deaths.

In one large bazaar known as the Patna and Jullussore, I learnt that more than 300 children had been inoculated in January and February without a single death; it is hopeless to expect the natives in this quarter to take to vaccination.

NATIVE PRACTITIONERS.

Native practitioners are very numerous in the district, the most popular man was formerly (but many years since) an apprentice in the Balasore dispensary; he uses European medicines extensively; he is a Christian of very dissolute habits, and on this account, his Mussulman rival is gradually getting all his practice.

There are four or five *kobirajes* who practise on the "no pay, no cure" system. Mercury is very largely used by all, and for almost every disease; some frightful cases of mercurial salivation and ulceration are the consequence.

39.—CUTTACK.

THE REPORT IS BY DOCTOR J. MACDONALD, CIVIL SURGEON.

I. "Cuttack.—*Latitude* 20° 28′ 45″ *North.—Longitude* 85° 50′ 50″ *East.*

III. Moderately healthy.

IV. The town of Cuttack has improved in a sanitary point of view within the last few years; as regards the district as a whole, there cannot be much difference between this and former years.

VII. "The prevailing diseases are intermittent fever, rheumatism, dysentery and diarrhœa, cholera and small-pox at certain seasons, the latter appears about the beginning of the year, the former in May, June, July and August. The death rates from these diseases, it is impossible to state, as no returns have ever been kept, and pilgrims passing to and from Pooree, who are unknown, and have no friends in the district, are the greatest sufferers ; they die at the road sides, and their bodies remain often unburied.

Leprosy not uncommon; elephantiasis very prevalent.

IX. Nothing reliable; criminal abortion is said to be very common but infanticide is not so.

X. The town of Cuttack has been exceptionally healthy during the past year; the freedom from mortality is attributable to the absence of any severe epidemic of cholera or small-pox. Pilgrims were prohibited from passing through the town of Cuttack, either on their way to, or from Pooree. The district has, however, suffered a good deal from cholera, as no provision was made to guard the villages through which the pilgrims passed."

As regards the health of jails, police battalion and military, a fair average cannot be made this year. The only regiment here has been divided into wings, one was stationed at Sumbulpore and returned in March sickly ; the other has been employed along with the police in the hills on field service and both the wing and police have returned bloodless and sickly, from repeated attacks of fever. Under these exceptional circumstances, I will take the past year instead of the present, as a fair example of the sickness and mortality per 1000."

	Strength.	Average daily sick for the year 1867.	Mortality per 1,000.
37th Regiment, Madras Grenadiers ...	694	20¼	10
Police Battalion	897	15	9
Jail	613	33	104

The present population of Cuttack is supposed to be about 50,000 in all.

The District of Cuttack is "an alluvial delta having a slope to seaward of about fourteen inches to a mile." The richest tracts usually skirt the banks of the main rivers. To the west the land rises towards the Gurjat Mehals, a hilly region presenting sandstone, a kind of syenite, and laterite. Whenever laterite occurs water may be found at a few feet below the surface, unless the ground has a well-defined slope, in which case the porous nature of the soil permits a rapid filtration to the out-crop at the lower levels.

All the minor water-courses have dry beds generally by the middle of November. Wells are by no means so prevalent in the district as might be expected; and during the late famine great privation and hardship were often experienced, owing to the complete drying up of the tanks on which the water-supply depended; this may be the more readily understood when it is borne in mind that, in years of drought, the tanks are nearly baled dry to afford irrigation to the crops; nevertheless when wells do occur water is found not very far from the surface, seldom more than twelve or fifteen feet.

A few miles above the city of Cuttack the river Mahanuddy branches off into numerous distributions, which bear the flood-waters of 40,000 square miles of inland drainage, through the delta lands of Cuttack and Pooree, to the sea.

The district to the east of Cuttack is liable to inundation, by high freshets, during the months of June, July, August, Septemler and sometimes October. The depth of the flood varies with the distance from the margin of the different rivers; near them it is from one to three feet; at a distance the land is covered with water to a depth of from three to nine feet. The nearest canal skirts the east end of the city of Cuttack, but does not interfere with its drainage; the canal bed being on an average from seven to eight feet below the ground surface adjacent.

Below Cuttack this canal follows the high ground, skirting the left bank of the river Katjooree, and when it is filled with water, the surface will be above the general level of the country for some distance northward—this description will serve for all the canals at present under construction by the Irrigation Company with the exception of the canal proposed to connect Cuttack with Calcutta. This last work has a north-easterly direction and so far as it has been constructed roughly follows the highest edge of the delta lands between the rivers Mahanuddy and Braminee. The Irrigation of the country is dependent on the canals now being constructed by the Irrigation Company; a rude and imperfect kind of irrigation has been heretofore practised by baling from *jheels* and tanks, and in seasons of drought the rivers are sometimes *bunded* to raise the water for the same purpose.

The town of Cuttack is studded and surrounded with patches of swampy broken ground, the drainage of which has within the last three years been effected by a connected series of open cuts, the main channel of which has its out-fall near the south-eastern end of the town. It is thereafter continued along the south bank of the Katjooree, into a cross-branch of which it finally discharges.

The western and eastern sides of the town are bounded by paddy-fields, but such fields are on the west of a very limited area, while the expanse of rice cultivation on the east extends for forty miles towards the sea.

3. The depth of water from the surface varies from eight to eighteen feet according to season of the year, but in many of the villages skirting the hills, when the wells are sunk into a substratum of laterite, the water may be found within from two to ten feet of the surface according to the time of year.

8. Tanks are not numerous; where they are most so, is along the base of the hills; generally there may be about four to a square mile, but many of them are mere small depressions.

The jungles are regularly fired in the months of January and February.

13. The east end of the city of Cuttack is skirted by paddy-fields, but the rice plains lying north and south are separated from Cuttack by the broad rivers Mahanuddy and Katjooree.

The price of food varies considerably; ordinarily prices are very moderate. The produce of 1868 is believed to be below the average of former years. Blights are not liable to occur; after severe inundations the crops occasionally suffer, to some extent, from insects which are generated apparently under a moist atmosphere and half-decayed vegetation."

SANITATION, &c.

"The sanitary condition of Cuttack is bad, owing to defective drainage and prevalence of nuisances, but efforts are being made by the civil authorities to repair defects. The Magistrate is responsible for the sanitary condition of Cuttack; both he and the Joint Magistrate have been exerting themselves to mend matters; much has been done lately towards drainage; a deep drain has been cut through the centre of the cantonment, for the purpose of carrying away surface-water, a few shallow tanks and swamps have also been dried by this drain.

Water is obtained from wells, tanks and rivers; water from wells is generally used for drinking purposes, and is on the whole pretty pure and good.

I am not aware if it has been ever properly analyzed. The supply is always abundant; a little more care, however, should be taken to prevent percolation; it is a very common practice for natives to wash themselves close to a well, and they are not careful as to where the water goes; it finds its way, or at least a portion of it, into the well, by percolation.

Tanks are never or very seldom protected; no drain exists generally either round wells or tanks. I am not aware that any system of regularly cleaning out the wells exists. Tanks are sometimes cleaned out for the sake of the rich manure or black soil which collects in them. No measures are generally adopted for preserving the purity of the water; natives bathe in any tank, and not unfrequently drink the water afterwards; clothes are as, a rule, washed in the river. Cattle are seldom bathed in tanks in the town of Cuttack, but in the district it is common to wash buffaloes and other animals in the tanks; the natives do not object to drink the water which has been so used. Pigs burrow in the bottom and edges of tanks. I have never known jute to be steeped in water used for drinking purposes. Carcases of animals are, by the lower castes, occasionally thrown into tanks. I consider the well water, as a rule, clean and good; the river water is always pure.

In the town of Cuttack overcrowding is common. The streets are narrow—not more than 12 or 14 feet on an average.

(*d.*)—DRAINS, CESS-PITS, LATRINES, &c.

" A main drain has been dug by the Department of Public Works by which all surface water is to be carried away; the arrangements have not yet been completed; this large drain opens into the river at a distance from the town of about two miles. The main drain is about four feet, the smaller ones not more and in some instances even much less than one foot deep. They are kept pretty clean, and are being better attended to, in this respect, than they formerly were; they are thoroughly cleaned out once a year at the public expense; the owners of houses adjoining are held responsible for their general cleanliness. They are sometimes obstructed by straw and other building materials, and when in that state, they overflow during the rainy season. The place is not properly drained but has been much improved lately, and improvements are still going on.

Well privies do not exist; there are no public latrines. The *excreta* of sick persons are not disposed of with any special care.

" In some villages, it is a practice to throw dead bodies, covered with a piece of coarse cloth, in an open place near the village, to be devoured by jackals and vultures. The bodies are not always carefully consumed by fire. The dead are interred as a rule about four feet from the surface, but in some instances not more than two feet. Corpses are not unfrequently (after being partially burned) thrown into pools in the neighbourhood of the villages.

(*g.*) *Slaughter of animals and disposal of their carcases.*

No regular slaughter-houses have yet been established in Cuttack. Cattle are killed near to the butcher's shop, and their carcases sold. The offal is not always carefully buried.

(*h.*)—OBNOXIOUS TRADES, NUISANCES, &c.

" Tanneries, dirtily kept cow-houses, nuisances committed on the banks of rivers, tanks and water-courses—are the principal nuisances. Brick-making is carried on, but not in the immediate vicinity of the town of Cuttack. Jute is never steeped in tanks here. The preparation of hides in the town of Cuttack is being prohibited.

There is less variety of food used here than in most other parts of India. I don't consider the food sufficiently nourishing and in many instances it is not properly cooked. The richer inhabitants use *ghee* and sweetmeats largely.

Intemperance is not common ; the only liquor used is that distilled from rice ; the juice of the date palm is also largely used."

SPECIFIC DISEASES.

" *Cholera*—from May to August.

Diarrhœa—not more common than at other stations.

Dysentery—common throughout the year.

Small-pox—from December to March.

Hepatitis—not common.

Intermittent fever—very prevalent.

Remittent—pretty common.

Continued—very uncommon."

NATIVE PRACTITIONERS.

There are *hakeems* in every village; their influence I am told is not increasing ; indeed, among the better classes, European treatment is anxiously sought after.

40.—POOREE.

THE REPORT IS BY DR. W. D. STEWART, THE CIVIL SURGEON.

I.—" Pooree.—*Latitude* 19° 48′ *North—Longitude* 85° 49′ *East.*

II.—The station is a healthy one, but the condition of the native town, from its being badly built and arranged and badly drained, gives rise to malarial fever and elephantiasis, and predisposes to other diseases.

IV.—I do not think much change has taken place in the present, as compared with the past condition of Pooree, because I am not aware of any great sanitary measure having been introduced. During the large festivals, more attention appears to be paid to the general cleansing of the town, but the depositon of *excreta* and filth, in and about houses, periodic overcrowding, entire absence of drainage, with other insanitary conditions continue as unabated in the present day as in years past.

V.—There are no statistics of sickness and mortality for the masses. There is no registration of any kind. Scanty information of the number of cases of particular sickness and deaths, is sometimes obtainable from the Police, but certainty and accuracy are not to be expected from their reports on such matters. The returns of dispensaries only show a fraction of what is going on around, and are altogether unsuited for comparison with the general sickness of the district.

VII. & VIII.—Cholera and small-pox are two of the chief specific diseases which may be said regularly to invade the town, but accurate data are wanting. Measles sometimes occurs. Malarial fevers with splenic cachexia and elephantoid enlargements are common diseases; syphilis, with its secondary evils, has taken a deep root in the town; tubercular and ulcerative leprosy are also common; Dr. Durant with an experience of four years in Pooree, believed that the disease was chifly imported by pilgrims from many parts of India coming to Pooree, to their god Lokenath, whose peculiar attribute is believed to be the healing of leprosy and other foul diseases, and for whom a separate shrine is placed in the city. Here the deluded unfortunates may be seen in numbers waiting for relief, they sacrifice all they have in the hope of being cured; as they get worse, and lose the means of support they find their way to the dispensary. Independent of this source of leprosy in Pooree, I have seen cases both in Cuttack and in this district where the disease appeared to be spontaneous among Ooryahs, sometimes coming on in subjects as early as twelve years of age. Lepra anæsthetica is more commonly seen at the dispensaries than the tubercular, ulcerative, or more aggravated forms of the disease. In the early stages patients apply for treatment, but as the disease increases they lose hope and cease to attend. It is not confined to the very poor and destitute, though commonly seen in its worst forms among them; men who earn a fair livelihood have been attacked. As an instance of its occurence among the well-to-do, the case of the late Rajah of Pooree may be quoted, who died a confirmed leper at the early age of 25. Elephantoid enlargement exists in Pooree to an astonishing extent, not only in the town, but villages of the district. I have seen two cases of it in boys who were not more than ten or twelve years old; in them it was said to be of two years duration. No statistics exist; it is very difficult to collect them as natives soon get suspicious and withhold information, and women who are affected hide in their houses and shirk enquiry. To a casual observer the proportion of women with enlarged legs would appear greater than men. Often both legs are affected, I believe the disease to be of malarious origin and connected with impure water (drinking and bathing) from stagnant tanks.

X.—No exceptional sickness other than epidemic cholera, occurred during the past year.

XI.—During the fairs regularly held in Pooree, sickness, of some kind breaks out, as a rule, if not among the towns-people at least among the pilgrims. Overcrowding, dirt, irregular living, and other insanitary conditions aggravate, if they do not originate disease; during wet weather many parts of the town are flooded, pilgrims either have no shelter, or what perhaps is worse, are huddled into close rooms. They are subject to great irregularity in diet by their dependence on *Moha-prasad* which is issued very irregularly, sometimes not before 2 o'clock; much difference of opinion exists on the quality of this food; its staleness and sour condition, however, are dwelt upon by all natives.

In February and March when the hot season commences, and about the time that *ticadars* commence operations, small-pox appears and sometimes spreads.

Jails.—During 1868 there were 687 prisoners under confinement, the ratio of sick to strength (per 1000) was 27, mortality among convicted prisoners, none.

" Police ..	.. Strength	... 521·3
" Sickness ..	..(per 1000)	.. 14·
" Mortality ..	.. (per 1000)	.. 2·

Replies received from the Magistrate of Pooree on 23rd February 1869:

1st. Mortuary statements have been rendered, since the 23rd March, for the whole district of Pooree, including the town, in accordance with Government Order No. 979 of the 24th February 1868, communicated with the Commissioner's Docket No. 554 of the 6th March 1868.

2nd. Note is not taken of infantine mortality.

3rd. The supposed population of the Pooree district is 5,28,712, but I regret that I am not in possession of the details, as to the proportion of adults and children, male and female.

4th. No register of births is kept in this district.

6th. The population is returned, in the Survey Map, at 232 per square mile."

TOPOGRAPHICAL CHARACTERS.

The following information was obtained from the Executive Engineer of the district:—

" Slope or fall of natural drainage, about one foot per mile.

The adjacent rivers are all branches of the Bargovy, which runs from east to west,—the branches north to south.

Surface drainage is carried through sluices into the rivers, at low water. July, August and September are the flood months.

One shallow and almost stagnant stream runs through the town, the *Attarah Nullah*; it is 200 to 300 feet in width, and five or six feet deep, and draws its supply from the Sur Lake, which is about five miles from Pooree.

Wells are seldom dry and are numerous; water is generally to be had at from 10 to 20 feet."

METEOROLOGY.

The mean average temperature of former years and that of the past year is as follows:—

	Past 12 years. °	1868. °
January	74·29	78·12
February	77·67	84·3
March	82·2	87·40
April	84 18	88·54
May	86·46	91·38
June	85·73	87·9
July	85·9	89·2
August	84·25	88·80
September	85·10	88·34
October	83·19	88·46
November	77·98	82·8
December	72·84	78·56

The average rain-fall for each month is as follows :—

	Past 12 *years.*		1868.	
	o		o	
January	1·1	inches.	·05	inches.
February	2·12	„	3·6	„
March	·57	„	0·25	„
April	3·70	„	1·7	„
May	3·53	„	5·4	„
June	7·98	„	11·	„
July	10·65	„	10·9	„
August	17-81	„	12·9	„
September	11·75	„	5·05	„
October	12·22	„	·3	„
November	3·7	„		
December	0·31	„		

The observations were taken by the native doctor attached to the jail. The rain-gauge was kept in an open compound, and raised two feet above the ground. The thermometers were placed in a wire cage under an open shed in the jail garden; the peculiarities of the past season were, unusual early rains in May and June (which, however, were not so heavy and destructive as at Cuttack and Balasore) and failure of the latter rains, which interfered with a good out-turn of *rubbee* crops. Dr. Durrant thus described his experience of the climate of Pooree : "The sea breeze blows for fully two-thirds of the year, with short intermissions. During the months of March, April, May, and June, the monsoon which blows up from the Bay of Bengal from the south-west, continues here night and day, reducing the temperature many degrees, so as to make it very congenial to the European constitution ; the thermometer standing in the shade during the hottest time in the day at 85° and 87° at sun-rise at 80° and 82°; and at 89° and 90° in the sun's rays at 4 P. M."

SANITATION AND CONSERVANCY.

"I have visited nearly every part of the town, passing through its principal streets, bye-ways, and secluded spots, and have no hesitation in pronouncing Pooree to be a most insalubrious spot, devoid of all sanitation. I will enter into detail as I go on. Much of the town is taken up by large tanks, gardens and *muts;* the remaining space is crammed with small huts, situated very disadvantageously, built irregularly, and cut off from free ventilation; owing to the late famine, many houses, large and small, are in ruins; no attempt is made to clear them, they are covered with underwood, and thus become reservoirs of filth and all manner of impurity. So far as internal sanitary economy is concerned, Pooree is not one whit in advance of the most neglected Indian villages. Although large sums have been contributed by rich natives, yet these have been expended on tanks now very much neglected; on *muts* which feed and enrich a few Brahmins; on gardens from which the poorer classes are excluded, which take up much room, and lie greatly in the way of better houses being built, and other improvements effected in the town. The largest garden is the Juggernath Bullub extending over eighty *beegahs,* in the heart of Pooree. There are many others similarly endowed, scattered in different parts of the town; they are not kept clean or in good condition, are not public, and many have filthy tanks inside. A thousand rupees is collected as a local tax, most of which supports the town police.

Local causes of malaria are plentiful in Pooree; the mounds of sand on the beach prevent the outflow of rain-fall from the town. When the Attarah-Nullah, Soonah-mookie, Bargovy, and other rivers overflow, the Summung *Jheel* and other swamps, lying plentifully to the north and west of the town, get filled; water accumulates in every ditch and hollow, and dries gradually as the hot season advances; the exhalations from such surfaces are potent causes of malaria. The pale, cachectic look, and general physical inferiority of the natives of Pooree, as compared with men of other towns and provinces, or even neighbouring villages, the extreme prevalence of elephantiasis, malarial fever and splenic enlargement, go far to support the truth of the above statement.

The drinking water is derived from tanks and wells. The *Narrindra Talao* is considered by natives to be the purest. It is the largest stone tank in the place, and is provided with a sluice which lets off a quantity of superfluous water in the rains, and with it a proportionate amount of impurity. It may be looked upon as the cleanest of all the sacred tanks. The five principal ones are of stone, many are very much below the surrounding level. Besides these there are numerous *kutcha* tanks, which supply drinking water to people living around; they are very filthy. The tanks are used as a privy; the water is covered with coarse weed and filled with organic impurity; surface water readily finds its way into them in the rains. In all tanks natives bathe their oiled turmeric-stained bodies, wash their clothes, rinse their mouths, spit in the water, and otherwise defile it. In some of the sacred tanks ceremonies are performed annually, or oftener, during large public festivals; these serve to contaminate the water still further. By the *Markund Talao* every devotee shaves his head; the hair is strewn about the place and blown into the tank. The *Markund, Indradomon,* and *Sethgunga* (especially the last) have a dense greenish oily scum on the surface; on the four corners of the *Sethgunga* are four wells, whose surface water is higher than that of the tank. On the sides of the tank (which are considerably raised) houses are thickly set, many of them old and in ruins, all having cess-pits and filthy drains. Is it not to be inferred that sewage of the houses with the sub-soil water finds its way into the drinking wells ?

There are many good *pucca* wells in Pooree, but their situation is amidst houses, where cess-pools abound, where also, in the absence of proper drainage, soakage of the house refuse continually takes place. Their produce under such conditions (at all times doubtful and suspicious) must be considered still more so, when the loose porous nature of the sub-soil is taken into account.

I believe in the rains the drinking-water of Pooree must become greatly contaminated, owing to surface-water readily sinking into the soil.

Wells or tanks are never cleaned out; neither are any means adopted for preserving the purity of the water."

DWELLINGS AND STREETS.

"The *muts* are the only large *pucca* buildings; almost all houses are small, badly built, and closely packed together. The high plinth, six or eight feet, on which some of the better houses are raised is, I believe, more accidental than intentional, and is chiefly due to the up-throw from excavations of tanks, so plentiful in Pooree, or from their being built on ridges formed by sand drift. The material of which walls are made, is a mixture of broken potsherd, clay and sand; the potsherd is obtained in large quantities from Juggernauth's temple (for new vessels are daily used, while the old are thrown away by the thousand.) The streets of Pooree, excepting the Burro Dand, are all very narrow; many lanes are only six to eight feet wide; there are no roads; the pathways are mostly sand and broken tile and potsherd; many houses are in ruins; many plots of ground are empty; these perhaps were intended for gardens, but now grow a wild shrubbery which gives cover to filth and rubbish; such accumulations are to be found at every turn, all being a great eye-sore and unquestionably a very great nuisance."

DRAINS, CESS-PITS, LATRINES.

"There is no plan of drainage in Pooree; water runs where it can, and collects in tanks and swamps abounding in and around the town. Some dry up in the hot season, others are perennial; not only are they useless but injurious; by proper drainage; such land could be reclaimed and converted, from being beds of pestilence, into healthy fields. Much of the unhealthiness of the town would be removed by the adoption of a successful scheme of drainage. The approach to Pooree from land is one extensive swamp. Commencing on the north-east at the Sur lake extending along the Mutta river to Attarah Nullah we come to the Myteanee *Talao,* a collection of putrid water close upon the town, and intersected by the Ganjam road; lastly the Summung *Jheel* completes the link along the west and south-west of the town.

During the rains, water has no escape, the lands behind the jail are flooded; the police lines are surrounded, and many parts of the town submerged.

There is no outlet into the sea. I believe this was once effected, but in the succeeding hot season it was again closed by sand drift; before attempting to improve the sanitary condition of the town, in other respects, this great defect should first be attended to.

Cess-pits, in Pooree are abundant; in some houses there are two, one in front the other behind. In huts there is only one, and that behind. The front cess-pool is a vault under the plinth of the verandah, and has a window-like aperture facing the street; there is no escape of sewage in dry weather; in the rains it overflows; this is the only time when there is any escape. The loose porous subsoil admits of ready and free percolation, hence the pit is never full in dry weather; into it urine and all fluid refuse of the house flows by a drain running beneath the floor. Behind the house, in the *budee* or small garden-enclosure, a pit is dug; this is the privy. I witnessed several, and never remember having seen more offensive abominations; neither earth, ash nor cover of any kind is provided. It is often only a few yards from the house, and it is allowed to become nearly filled with putridity; another pit is dug along side when the old one is nearly filled, to be followed by others used in a similar manner. I believe, without a single exception, this is the plan of disposal of human *excreta* in the native town; rich natives employ a servant, who does not remove the filth, but merely buries it, as mentioned above, in rear of the house.

There are no public latrines; to introduce dry-earth conservancy, suitable earth will have to be carted from a distance of two or three miles; the carts which bring fresh earth could carry away the *poudrette* for burial or utilization. The system would no doubt be expensive, but it is the only feasible plan of disposal of sewage in Pooree. Seven sweepers with carts are attached to the outposts of the town; the police are supposed to see that they clear up the town generally; this, however, is not done. I believe the sweepers are chiefly useful, during great festivals, to cart away rubbish near the temple and the Burro Dand; but as for cleansing the interior and more filthy parts of the town, they are far too few and want stricter superintendence. Refuse lies throughout the town, there is no regular removal of filth. I have not seen any cartage of rubbish for manure; it is occasionally practised in the mofussil.

At present, the public resort to the sands around Pooree; the slope between *Markund Talao* and the Ganjam road is mostly used for such purposes.

Burial, or occasional burning of the dead, is performed in the same place. The banks of the *Myteanee Talao,* the sands between the town and cutcherry, are also freely used as a privy. It is impossible to pass by without experiencing the most sickly and offensive odours; many hedgeways and bushes about the town are similarly the sites of great nuisances. The attention of the local authorities has been drawn to these public nuisances, and remedies suggested."

ACCUMULATION OF FILTH.

" There are no special accumulations in the town to which allusion has not been made, other than the cow-sheds interspersed in it, which are never cleaned out, and their environs are certainly damp and filthy *in the extreme.*

All children who die before the lobes of their ears are pierced, are buried; piercing is generally done about the fifth year. There are no burial grounds for natives. The dead are thrown on, or nominally buried in the sands adjoining *Markund Talao,* (already alluded to;) a few also are buried there; the chief burning place is the *Surgo-dwar,* in the sands of which many also are buried. About twenty *per cent* of the dead are burned; the remaining are all very indifferently buried. Cremation is not always completely performed—chiefly on account of fuel being dear in Pooree. The burning place at *Surgo-dwar* is sufficiently removed from the town, but it should be disallowed in Markund Sye, so also should the so-called burying place? The locality is only 50 to 100 yards removed from thickly inhabited parts of the town. During large pilgrimages, when there are many deaths, the proper disposal of bodies is still less carefully attended to; a separate staff of sweepers, to bury unclaimed dead, is absolutely necessary. The burial ground should be removed a mile further off.

GENERAL CLEANLINESS.

From the foregoing, it will be easily gathered that the general cleanliness and salubrity of the town is much below the mark, that the atmosphere is polluted by a large number of agencies—chiefly by perpetual overcrowding; by small badly-built houses wanting ventilation; by narrow irregular lanes; by cess-pits and sinks; by extensive deposits of filth, (the result of native habits in and around the town;) by the improper disposal of the dead; entire absence of conservancy; by very defective drainage, (more correctly no drainage at all;) and by noxious exhalations from *jheels,* drying tanks and swamps. Fortunately the prevailing winds are strong sea-breezes; were it not for this, there is every reason to believe that the mortality in the town, ordinary and extraordinary, would be largely increased.

It would be a great boon if there were some good roads in the town; at present there are none; the pathways consist of dirty, loose sand and dust;

progression, at all times difficult in Pooree, becomes in the rains impracticable; water accumulates everywhere, filthy puddles are formed along the streets, which are not only public nuisances inconveniencing the traveller, but they also seriously affect the health of all living in houses bordering on the street."

PERSONAL CLEANLINESS.

" The Ooryahs as a rule bathe daily before the morning meal. They delight to rub mustard or *jinjilee* (Sesamun Orientale) oil into their bodies before bathing; even the poorest native rarely fails to do this, believing that, by the habit, he preserves himself from much sickness. In drinking, as in bathing, natives are not particular regarding the kind of water used; often it is from in a tank, filled with animal and vegetable impurity. I believe much of the fever and elephantoid disease, and skin affections, common in the province are connected with bathing in such water."

DIET.

" Small fish, caught in dirty tanks, are sold cheap, and are consumed by the poor; such an article of diet must be unwholesome.

Stale rice soaked in water and fermenting—*puckal* as it is called—is commonly used; sometimes it has been steeped from three to five days, when it is very sour; the more acid it is, the more it is esteemed. The exact influence of this article of diet on the health of the people is unknown, but it is deserving of enquiry.

Opium and *bhdngh* are consumed by Bengalee Ooryahs, Brahmins, and *Pandahs* living in the town, but the genuine Ooryah, in his native village, is not given to intoxicating drugs.

The mode of life of the Ooryah peasants is agricultural; their food is of the simplest nature; meat they scarcely use; milk amongst them is a luxury, and sugar never an article of daily consumption; their social habits and customs, as far as I could observe, do not give rise to any special disease. It is only when epidemics sweep the land that unusual mortality prevails. This is due to the predisposition established by neglect of first sanitary rules. I consider that attention to a few general points will go far to establish better health among them and enable them to resist the aggressions of disease. I am speaking of mofussil villages, where abundance of pure air, good water, and wholesome simple food always prevails, and is readily obtainable. If the people knew that filth, in and about their dwellings, was as injurious as it really is, they would, I believe, be ready to remove it; neither are they aware of the pernicious effects of tainted water; so also, considering cold air very prejudicial, they live in very close rooms, shutting out light and breeze; the benefits of ventilation they have yet to learn. Cattle live in the same houses with themselves; often the front room is devoted to them, so that all persons entering, in and out, pass through an ammoniacal and offensive air."

In villages with scattered houses the more important sanitary improvements may be taught and introduced without much difficulty; for larger towns, especial supervision becomes necessary, on account of greater numbers, greater opportunity for the commission of nuisances, and less disposition on the part of the inhabitants to remove them."

EPIDEMICS.

" At the *Ruth-jatra* festival in 1868, the cholera outbreak was reported on by the Medical Officer in his letter No. 85 of 20th July; this I believe, was the chief epidemic. Isolated cases of cholera occurred from time to time either among pilgrims or the inhabitants of the town.

In December a mild form of measles was prevalent, and continued, off and on, till February; no deaths from it were reported."

SUGGESTIONS.

To prevent the desolating influence of cholera, to ameliorate sufferings, and lessen death from this cause, not only will the presence of a Health Officer, aided by an efficient staff, be required in Pooree, but it will be absolutely necessary to attend to the line of road traversed by pilgrims, where numbers lie down to die; the double object to be kept in view being the relief of present suffering and the prevention of the formation of *foci* of disease.

A dispensary at Piplee permanently, and at Sutyabadee temporarily, will relieve much distress. Between Piplee and Cuttack another temporary dispensary should be ready for work whenever required; a staff of bearers to convey sick will always be required. One extra native doctor at least should be provided in the sudder station, to meet unusual and heavy calls for medical aid. Sick pilgrims, deserted by their friends, on recovery find themselves penniless; for such some pecuniary aid is necessary, otherwise they travel two or three stages, are liable to get cholera, or perish from disease brought on by starvation."

VACCINATION AND INOCULATION.

" Inoculation is practised throughout Orissa; the natives are greatly in favor of it, being chiefly influenced by religious motives, urged by Brahmin *Ticcadars.* That it has served to check the ravages of small-pox in years past there can be no doubt; that it has also, in some instances, started the disease and done mischief, there can also be no difference of opinion.

Vaccination has made very little progress in Orissa. There may be said to be no vaccine establishment, or what little there is is totally inadequate for the work. One or two vaccinators attached to the district, residing for the greater part of the year at the sudder station, with scarcely any supervision, and left to work their way without legal support, against the opposition of *ticcadars* and the prejudices and fears of the people, cannot be expected to make much progress and, are, to say the least, a mere nominal agency for this important branch of preventive medicine. Lately, I have succeeded in inducing natives of villages about Markundpore (about eighteen miles north of Pooree) to adopt vaccination. It required much patience and persuasion to make head-way at first, but I am glad to report that all the villages around have, at last, taken kindly to it. Yet I believe that unless I had frequently visited the place, encouraging its adoption and allaying the fears of the people, the vaccinator would have met with very little success. As it is, arm to arm vaccination has been introduced, a special temporary vaccinator employed, and the whole neighborhood protected by careful vaccination. Were inoculation prevented and an efficient vaccine, staff for Orissa provided, I believe a successful vaccination, throughout the province, would in a few years be an accomplished fact.

QUARANTINE.

Considering that we have so much to do in remedying the more gross evils connected with cholera, and its manifestation, year after year, in Orissa; remembering also the extremely doubtful view, and in some instances avowed disbelief in the opinion of its spread by human intercourse, I am of opinion that time would be lost, unnecessary labour spent, and very great annoyance caused by the addition of distraint to the many other hardships pilgrims have already to endure. I fully believe that, under present circumstances, it would do more harm than good, and that, in spite of its imposition, the seeds of cholera whatever they may be, and however they may travel, will manage to escape and be readily developed in places most neglected by sanitation, among bodies of men who most disregard its rules.

NATIVE PRACTITIONERS.

In many villages there is no *boid* are *kobiraj;* the sick manage the best way they can. I have endeavoured to ascertain if the simplest purgative or other medicine was in use or could be obtainable, but could find none. In large villages, sub-divisional and sudder stations, *kobirajes* are found, but not to any great extent."

While in Cuttack, nearly 1,000 Rupees was obtained, by local subscription from natives, with which it was proposed to maintain about six sons of *kobirajes* in the dispensary for two years, to be collected from different parts of the mofussil, giving them clinical instruction and afterwards sending them to their houses to practise with their fathers.

The Dispensary Committee, warmly approving of the plan, directed that the measure should be adopted.

Part III.

SPECIAL REMARKS

ON THE

FORTY LOCAL REPORTS.

Part III.

SPECIAL REMARKS ON THE FORTY REPORTS RECEIVED.

The stations have been arranged in the following manner, in six groups:

Central.

1. Bhowanipore.
2. Howrah.
3. Hooghly.
4. Jessore.
5. Kishnaghur.
6. Berhampore.
7. Furreedpore.
8. Burrisaul.

Eastern and South-Eastern.

9. Dacca.
10. Mymensing.
11. Tipperah.
12. Noacolly.

Northern.

13. Kooshtea.
14. Pubna.
15. Rampore Beauleah.
16. Maldah.
17. Rungpore.
18. Julpigoree.
19. Darjeeling.
20. Purneah.

Western.

21. Burdwan.
22. Cutwa.
23. Bancoorah.
24. Raneegunge.
25. Soory (Beerbhoom).
26. Rajmehal.
27. Deoghur.
28. Purulia.
29. Chyebassa.
30. Hazareebaugh.

North-Western.

31. Bhaugulpore.
32. Monghyr.
33. Gya.
34. Patna.
35. Mozufferpore (Tirhoot).
36. Chumparun (Moteeharee).

South-Western.

37. Midnapore.
38. Balasore.
39. Cuttack.
40. Pooree.

The general limits of the area of the six above-named groups, may be defined as follows:—

1. The *Central* area is somewhat triangular, with the sea-board to the south, the Hooghly and Bhaugiruttee to the west, and the Pudma and Lower Megna to the east.

2. The *Eastern* and *South-Eastern* area includes all to the east of the Lower Megna, Pudma and Jamoona.

3. The *Northern* area includes all to the east of the Ganges and Kossye, and to the west of the Brahmapootra and Teesta.

4. The *Western* area takes in all to the west of the Hooghly and the Bhaugiruttee, to the north of Orissa, and to the south of Behar. It includes Chota-Nagpore and the Sonthal Pergunnahs.

5. The *North-Western* area includes places lying to the west of the Kossye river, and to the north of the Sonthal Pergunnahs, and Chota-Nagpore. It extends to the borders of the North-Western Provinces.

6. The *South-Western* area comprises Orissa and the Tributary Mehals.

1.—BHOWANIPORE.

The picture of Bhowanipore, furnished by Baboo Ram Chunder Sen, shews in what a condition is one of the largest suburbs of Calcutta. Certain parts of it are said at times to be impassable from the accumulation of filth ; the drains are said to have no proper slope, and to be of varying levels at the bottom.

One large drain was found " filled, from top to bottom in its whole length," with filth of all descriptions. The place generally is most insufficiently cleansed Proper scavengering is never thought of. The contents of the drains are occasionally washed into the river by rain-fall ; otherwise everything remains to rot where it falls. The floors of the houses are damp, and the interiors often most offensive. In many instances the lower room is a receptacle of ordure, which is not removed for months, or even years.

Baboo Ram Chunder's picture of a private privy is very terrible ; as are also his descriptions of the mode and accessaries of cremation, of the conditions of uncleanliness which obtains around the shrine of Kali, and of the state of the cow-sheds at Bhowanipore ; and yet there is no reason to consider them inexact or exaggerated. Nothing could be more unsatisfactory ; strict supervision is evidently much required. Here we have a sketch of places, where the blood of hundreds of sacrificed animals, the decomposing refuse of rice, and human ordure, are all putrefying together in mass ; where the burning of the dead occurs in the midst of the population, and dogs and jackals not unfrequently devour corpses carelessly committed to the flames. It is very evident that interference on the part of the Government is much required at Bhowanipore. Indeed all the suburbs of Calcutta are in a most un-cared-for state, and I hope that this matter will be specially taken up.

2.—HOWRAH.

The report is not worthy of the Civil Surgeon, whose abilities are great. It seems to have been written by an Assistant. Still there are certain points of interest to be commented on. The station is said to have been, to a marked degree, less healthy since the cyclone of 1864. There has been chiefly an excess of dysentery and diarrhœa. The record of such a result is interesting, although by no means unprecedented. Inundations of rivers, and casual eruptions of the sea have been known to induce excessive sickness in Holland, on the shores of the Baltic and of the Persian Gulf, in the case of the Pontine Marshes, and at Leyden in 1679. Such instances are referred to by Macculloch, in various parts of his classical work on Malaria. Sir Ranald Martin (Influence of Tropical Climates, para. 14) remarks on the great excess of epidemic sickness in and around Calcutta, which resulted from the calamitous inundation of the 21st May 1833. The rain-fall at Howrah is said to have been 103·2 inches, in Calcutta it was 91·49.

At Howrah the mean of the thermometric maxima is month by month lower than at Calcutta, whilst the monthly mean of the minima is steadily higher. It is to be regretted that the barometer and hygrometer are not in use.

The drainage of Howrah evidently requires to be carefully looked to. This is the more necessary, since it is a very rapidly growing place. Many large trees are reported as having been lost in the cyclones of 1864 and 1866. Others should be planted. The casting of night soil into the river should be strictly prohibited. Such a practice simply poisons the sailors of the port. It is evident that the subject of cremation demands attention; and slaughtering places should be removed from the vicinity of the main road.

3.—HOOGHLY.

This report is good, but it is rather short. The consideration of certain subjects of importance is altogether omitted.

Dr. Thompson, who takes the utmost interest in his duties, reports carefully regarding the Hooghly fever. He very properly insists upon the fact of its being entirely due to local causes, and to its non-contagiousness. So much has now been written regarding this fever that it scarcely requires to be commented on here. My opinions on the subject are embodied in my letter of the 25th March 1869 to the Secretary to the Government of Bengal. Government has now taken up the matter, a careful engineering survey is being made; extended medical relief is being organized. The results will certainly be most beneficial. It is to be noted that the health of the European soldiers, and of the prisoners in the jail at Chinsurah, has been good. The low mortality in the jail is very satisfactory. I have seldom seen a jail cleaner or more carefully supervised than that at Chinsurah. The Inspector General of Prisons bears testimony to Dr. Thompson's efficiency in this respect. From the Meteorological records we see that the lowest mean monthly temperature was 68° in December, and the highest mean 86° in July. The very unusual rain-fall during 1868, is remarkable. In August 40·51 inches fell against 6·60 during the same month, the previous year. In April, June and September, the excess is also worthy of note. Dr. Thompson has furnished an analysis of the soil near the jail. It is much to be desired that similar analysis should be conducted at other stations. The result of Dr. Thompson's self-consuming smoke furnace will be a matter of considerable importance. The trial of Norton's tube wells will be referred to in an after part of this report.

4.—JESSORE.

The report by Dr. Kenneth McLeod, is a very good one indeed—one of the best that I have received. Dr. McLeod shows that the so-called epidemic fever of the district is really a mere aggravation of the ordinary intermittent of the country. This fact has been too much ignored both in a medical and sanitary point of view, Dr. McLeod's returns showing prevalence of different specific diseases, in a long series of years, are very interesting—as are also his remarks as to their distribution throughout different periods of the year.

The suggestion brought forward as to the advisability of having gauges to show the varying water-levels in rivers, *bheels* and tanks, is a most useful one, and ought to be carried out as far as possible. It is only by such means that we shall come fully to understand the significance of comparative degrees of humidity or of drought—as affecting ground-conditions, upon which disease so much depends in India. The changes which have occurred in the course and condition of the river Bhoyrub, deserve careful consideration; upon this will greatly depend the future sanitary state of Jessore.

If the river be allowed to go from bad to worse, the health of the station will most certainly deteriorate. The question is an engineering one. As far as I can myself judge, the deepening of the bed of the river is much required.

Dr. McLeod's Meteorological reports and his notes on Climatology are accurate and creditable, and he well describes the topography of his station.

A slaughter-house ought to be built at Jessore.

It is worthy of note that cholera appeared soon after the cyclone of 1867, and disappeared on the occurrence of heavy rain-fall.

5.—KISHNAGHUR.

The report does not enter into the subject of the past history of the station so much as might have been desired. The facts, so far as I could learn them from personal enquiry, are very interesting. In former times, when the Jelinghee (or Khurrya) river communicated with the Unjuna, Kishnaghur was not unhealthy; gradually, by silting and other gradual influences, the communication ceased, and the place became unhealthy.

Forty years ago the Khurrya and Unjuna were continuous streams; and even up to 1850 or 1851 the water of the Khurrya reached the Rajah's tank. Epidemic fever (so-called) prevailed most severely at Kishnaghur in 1863-64. During the first year, as far as I could learn, about 1,000 people died. The epidemic continued up to 1867. About 1,000 persons are said to have died in 1865-66-67. In 1866 deep tanks were constructed by means of convict labour, and the flood-waters of the Khurrya were let in. This had a most beneficial effect. I am informed that great improvement in public health ensued, and that the change seemed to be a direct consequence of the completion of this public work. If it was truly so, which it seems to have been, the inference to be drawn is that the pestilential dry bed of an old river was the source of great sickness, the amount and fatality of which diminished, as the said dry bed was improved; in other words as natural drainage was looked to, and a comparatively wholesome supply of drinking water was obtained. Throughout the prevalence of the epidemic, the jail and portions of the sub-division called Gwarry, were not affected. The jail water-supply is the best in the town, being taken from the deep and clean tank adjoining the prison. In that part of Gwarry which was exempt from sickness, there was no jungle, and no old tanks and holes. The people in this quarter drank the water of the river Khurrya, which is considered better than that of tanks. On the other hand, the people in the part of Gwarry which was severely affected got their supply from the Shurnamoy tank, the water of which was of inferior quality. The tank has of late been repaired; still the water is comparatively bad.

In 1864, Lieutenant C. N. Judge of the Royal Engineers, Executive Engineer, 24-Pergunnahs' Division, submitted a report to the Government for the improvement of the Bejoy and the Unjuna Khâls. I went carefully over these suggestions, when I inspected the localities referred to, and they appeared to me very judicious. Since Lieutenant Judge wrote, the conditions have been somewhat altered, and so far as this has been the case, improvement in the health of the town of Kishnaghur has taken place. There still remains, however, much to be done to complete the work which has been commenced; a long deep tank might, with great advantage, be constructed on the station side of the Rajah's tank. The cost of such a work was estimated by Lieutenant Judge, at Rs. 3,500, and the cost of a raised road, along the course of the *khâl* to connect the new tank with the road on the north bank of the Rajah's tank, would probably be about Rs. 2,000. There are many stagnant pits which require to be either deepened or filled up. The moat round the Rajbaree is in a ragged, neglected state. It ought to be thoroughly cleaned and drained. It was proposed by Lieutenant Judge that such drainage should be conveyed by small culverts into the Rajah's tank; but on sanitary grounds, I consider this objectionable. It should if possible be led away to the south, in the direction of the tanks, but not into them. Lastly, as proposed by Lieutenant Judge, the bed of the Rajumali Khâl beyond the Rajah's tank, should be levelled; the ground on both sides of it well drained; and the two tanks beyond, and the upper end of the Unjuna Lake should be deepened from the centre. Were such improvements carried out, and surface drainage systematically opened, I think Kishnaghur would be a healthy place.

It being in contemplation to cut a canal from the Bhaugiruttee River at some place (not yet precisely determined) near Moorshedabad to Calcutta, the course of which will be to the east of the Hooghly, Engineer Officers have been engaged, making exact observations of the country, and in connection with this work, Major Searle showed me most carefully executed maps which he and his field party had prepared. His cross sections and surveys comprise great part of the Nuddea, Moorshedabad and Jessore districts, and part of the 24-Pergunnahs. Such level are much required, and they are likely to prove most useful in a sanitary point of view.

The meteorological observations kept at Kishnaghur show that the rain-fall in 1868 was unusually high, *viz.*, 76·4 inches—against 56·4 inches in 1867; 48·0 in 1866; 66·6 in 1865 and 67·8 in 1864.

6.—BERHAMPORE.

The report, by Dr. Fleming, is a particularly good one. It is to be observed that an unusual amount of fever prevailed at Berhampore during the year under report. There can be little doubt, as stated by Dr. Fleming, that this was due to imperfect drainage and bad conservancy; both of which causes operated most powerfully when the thermometric range, and the humidity were extreme. The station is most unfortunately situated; indeed, setting strategic reasons aside, the site of it is almost as bad as could be imagined. The barracks were, I believe, declared by General Havelock to be the finest in India, and their original cost is stated, by Dr. McClelland, to have been £3,000,000. Yet when the river rises to its highest, the station is three or four feet below the water level, and has consequently to be protected by a strong *bund.* During three months of the year, drainage into the river becomes impossible, and, when I visited the station, I found vast swamps surrounding the place on all sides. So far as I could discover, the levels of the surrounding country had never been taken, except in the immediate vicinity of the barrack-square; drains appeared everywhere to be choked; indeed the place was absolutely water-logged. Nothing could be more unsatisfactory. Three feet of stagnant water was found in the masonry adits which pass within thirty yards of the foundation of the finest barrack. The soil is a stiff clay, retentive of moisture; the place generally is very dirty; the conditions of insalubrity, both natural and artificial, abound; the people are miserable in appearance and very cachectic. The drainage system, which consists of a series of tanks, leading to a *jheel,* 108 acres in extent, with an outlet towards the river, has in the course of years, greatly deteriorated. The tanks have silted; the *jheel* is in many parts choked with rank vegetation, and one at least of the sluices seemed to me to have fallen into disuse. To complete this unhappy picture, the local funds available for sanitary purposes, are altogether incommensurate with the requirements of the place; the average monthly receipts of the cantonment fund, amount to Rs. 186, whilst the average monthly expenditure is 256-8. At this rate, the excess of expenditure over receipts, being Rs. 70-8 *per mensem,* the fund will be bankrupt in two years.

The financial condition of the Berhampore Union is somewhat similar to the above. The total monthly collections amount to Rs. 1,100, of which 800 Rs. go to the police, and Rs. 220 to conservancy. The excess of expenditure over income equals Rs. 29 *per mensem.* Under such circumstances as these, it is difficult to see how much-needed improvements can be effected; and yet, unless something is done, matters must go on from bad to worse. I confess I do not know from what source funds could best be taken, but that the expenditure of money is necessary, is very certain. What is most wanted is a project for the thorough drainage not only of the cantonments, but of the country around ; such a project was called for in January 1856. As far as I can judge, from a careful study of past records on the subject, Major Abercrombie's scheme is the best that has yet been proposed. It would cost a considerable sum of money, but nothing short of this would, I believe, prove effectual. The plan consists in having an engine and pipes at Khagra, whereby the level of the Kalkapore *Jheel* could be kept down, and surplus waters—even during the rainy season—pumped over the *bund,* into the river. In this manner the drainage of the station would be very greatly improved, and the country around would not be swamped. Expensive as this project may be, looking to the original cost of the barracks, to the occasional extreme unhealthiness of the station, to the fact of its having already been temporaily abandoned, once if not oftener, and to the removable nature of the insalubrious conditions which exist around the garrison, it appears well worthy of the consideration of the Government, whether Major Abercrombie's scheme should not be carried out in its entirety. I am inclined to think that, in the long run, it would be found to be the least expensive method of carrying out radical sanitary improvement at Berhampore. At the same time an extensive engineering survey of the surrounding country is absolutely necessary. All natural water-courses and drains should be charted, and kept for permanent reference, in the Collectorate. The Lall Diggee and adjoining tanks ought to be considerably deepened. The edges of the Kalkapore *Jheel* should be cleared and two rows of trees planted all along its southern aspect. The letting out of surplus water from the *jheel* early in the rainy season should be attended to with great care. This point seems to have been somewhat overlooked in 1868, and I am inclined to think it was, to a great degree, the cause of excessive sickness. Again, the Executive Engineer should never open the sluices except after careful consultation with the Civil Surgeon. Upon points of this kind, hinges the health of the garrison. The rank vegetation in the Kalkapore *Jheel,* which now threatens to choke it altogether, should be most thoroughly removed. The village of Chooanpore to the south, and the localities around it are in a state of terrible neglect. The part of the station known as "Khagra" is also in an indescribably pestilential condition. From the proceedings of the Cantonment Board of Health, I find that this quarter has often been minutely described. There are a great many small ponds communicating irregularly with each other;

these contain stagnant water; and they are defiled to a fearful degree. Cholera and small-pox are known to rage here with unusual severity; so much so indeed that one part of Kaddai has been called "Cholera Island." In one epidemic visitation 100 persons died there in a few weeks, within an area of two acres. This part of the station ought to be improved; the hollows above referred to, if left in their present state, are likely to be very prejudicial to public health. Where they cannot be filled up they should be deepened; some of them might possibly be filled up with sand brought from the river bed.

It is to be observed that Dr. Fleming remarks that for seven years he has been making sanitary recommendations, which, from want of funds, have remained unattended to. It would be most advantageous if the Chultea *Jheel* could be partially drained into the river, as proposed by Dr Fleming. I believe that in 1856 a line of levels was taken, with reference to a question asked by the Lieutenant-Governor regarding the drainage of the Chandoo and Posse *Jheel*. At that time such a project was not considered feasible.* The following are abstracts of Meteorological conditions at Berhampore since 1861. I am indebted for these to Dr. Fleming.

Abstract of Meteorological observations at Berhampore for 1861.

MONTHS.	Thermometer in the shade.			Barometer.				Fall of River.
	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.		Inches.
	°	°	°	°	°	°		
January ...	76	57	67	30·00	29·62	29·81	Easterly.	0·60
February ...	80	57	71	·05	·55	·79	Westerly.	......
March... ...	93	70	79	29·98	·64	·77	Westerly.	......
April	97	71	86	·80	·42	·65	Easterly.	1·60
May	94	75	85	·75	·35	·54	Easterly.	7·35
June	90	78	80	·70	·35	·49	S.E.	14·20
July	89	79	83	·63	·30	·44	S.E.	13·70
August.. ...	89	80	83	·72	·35	·54	S.E.	9·05
September ...	89	80	84	·82	·32	·52	S.E.	8·30
October ...	86	76	82	·95	·50	·73	E—N.W.	17·05
November ...	82	63	74	·98	·70	·83	N.W.	·90
December ...	72	55	66	30·00	·78	·87	N.W.	·50

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* NOTE.—Since writing the above I have learnt from Mr. Crommelin, the Superintending Engineer of the Circle, that careful levels have lately been taken of the country around Berhampore, that there is a considerable fall to the east and south, and that drainage in that direction will be possible. This is a most important fact, and it will, I hope, lead to the thorough drainage of the station, away from the river.

For 1862.

MONTHS	Thermometer in shade.			Barometer.			Rain-fall.
	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	In inches.
	°	°	°	°	°	°	
January ...	73	55	62	30·02	29·70	29·89	0·20
February ...	84	58	74	·05	·50	·78	......
March ...	90	66	74	·00	·55	·79	0·90
April	94	72	83	29·85	·45	·66	4·40
May	98	70	82	·80	·45	·61	3·70
June	95	77	86	·65	·30	·47	6·05
July	87	83	85	·67	·27	·43	9·00
August ...	88	82	85	·65	·27	·46	7·35
September ...	89	81	85	·80	·45	·62	8·40
October ...	87	75	81	·95	·37	·66	15·05
November ...	80	69	74·5	·95	·71	·83	... ..
December ...	73	63	68	·99	·72	·85	......
Total, Mean ...	......	......	......	·78	29·5	TOTAL	55·05

For 1863.

MONTHS.	Thermometer in shade.			Barometer.			Rain-fall in inches.	Monthly admissions to Jail Hospital.	Average daily sick.
	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.			
	°	°	°	°	°	°			
January ...	70	62	66	30·05	29·80	29·92	...	5	3·25
February ...	77	66	71·5	29.96	·68	·82	0·65	4	3·32
March	85·5	73	79·2	·88	·60	·74	...	4	0·96
April	94	72	83	·78	·41	·59	3·4	5	2·5
May	96	74	85	·77	·35	·56	4·3	13	5·16
June	97	79·5	88·2	·65	·23	·44	13·5	5	5·16
July	90	80	85	·60	·30	·45	7·45	10	4·51
August	86·8	78·9	82·8	·67	·93	·50	11·6	11	5·16
September ...	87·4	81·7	84·5	·69	·42	·55	5·09	16	9·06
October ..	90	73	81·5	·93	·50	·71	1·85	41	15·1
November ...	84	62	73	·96	·67	·81	0·1	27	17·5
December ...	74	57	65·5	·96	·76	·86	...	24	13·77
Total ...	...	...	78·76	...	...	29·68	47·94	......	...

For 1864.

MONTHS.		Thermometer in shade.			Barometer.		Rain-fall in inches.	Monthly admissions to Jail Hospital.	Average daily sick.
	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.			
	°	°	°	°	°	°			
January ...	73	52·5	62·7	30	29·65	29·82	...	21	17·8
February ...	80	54	67	30·40	29·53	29·96	0·3	26	17·8
March	82	69·7	75·8	29·96	29·60	29·78	0·9	28	17
April	94	80	87	29·70	·60	·65	0·6	19	19·7
May	92·5	80·5	86·5	·82	·43	·62	2·45	16	15·5
June	92·18	81·2	86·6	·56	·36	·46	11·85	20	14·4
July	89·1	82	85·5	·56	·31	·43	8·61	18	11·4
August	88·3	81·3	84·8	·61	·47	·54	9·80	16	6
September ...	89·3	80·7	85	·62	·56	·59	10·52	21	12
October	85·7	75·3	80·5	·83	·72	·77	6·38	25	11·7
November ...	79·7	67·7	73·7	30·23	29·86	30·04	1·67	16	10
December ...	80	52·5	67·3	30·16	29·81	30·0	...	20	11
Total ...	83·5	67·25	74.87	...	...	29·73	53·08	......	...

For 1865.

MONTHS.		Thermometer in shade.			Barometer.		Rain-fall in inches.	Monthly admissions to Jail Hospital.	Average daily sick.
	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.			
January	77	58	67·5	30·15	29·82	29·98	...	12	10·6
February	80	61	70·5	29·89	·97	·83	2·0	8	8·2
March	85	68·5	76·7	·83	·72	·77	2·2	9	11·4
April	92·3	78·4	85·3	·71	·57	·64	2·2	12	12·4
May	88·1	78·2	83·1	·60	·50	·55	9·09	13	11·6
June	91·1	82·5	86·8	·50	·42	·46	3·95	17	12·0
July	88·6	81·8	85·2	·51	·43	·47	14·10	16	10·3
August	89·3	81·8	85·5	·55	·43	·49	9·01	20	9·9
September	89·3	78·8	84	·68	·57	·62	8·75	49	17·3
October	90·5	77·2	83·5	·78	·66	·72	...	53	25·7
November	80·4	62	71·2	30·0	·65	·82	...	53	28·9
December	74·6	56·6	65·6	29·91	·83	·87	...	24	23·5
Total ...	83·45	69·55	76·2	29·82	29·69	29·72	51·30	......	...

For 1866.

MONTHS.	Thermometer in shade.			Barometer.			Rain-fall in inches.	Monthly admissions to Jail Hospital	Average daily sick.
	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.			
January	72·9	54·2	63·5	29·90	29·81	29·85	0·77	22	14·67
February	75·6	56·7	66·15	29·84	·74	·79	2·12	20	17·6
March...	91·7	68	79·8	29·93	·50	·71	1·0	15	9·3
April	90·7	71·8	81·25	·71	·64	·67	7·85	17	12·1
May	94·1	79·3	86·7	29·63	·55	·59	2·42	16	10·4
June	98	70	84	·51	·35	·43	10·34	16	10·46
July	87·6	80	83·8	·51	·46	·48	10·22	13	9·8
August	87·7	80·8	84·25	29·72	·35	·53	7·77	25	15·2
September	89	80	84·5	·60	·53	·56	7·03	19	18·3
October	87·4	77·7	82·5	·67	·63	·65	2·65	36	18·3
November	82·2	67·5	74·85	·97	·78	·88	...	32	21·7
December	73·2	57·1	65·15	30·5	·70	30·10	...	33	21·7
Total ...	84·33	67·5	78·93	30·0	29·58	29·79	52·17	......	...

For 1867.

MONTHS.	Thermometer in shade.			Aneroid Barometer unreduced.			Rain fall.
	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	
January	74·1	57·87	65·98	30·19	29·83	30·01	0·95
February	77·35	61·4	69·37	29·95	29·62	29·78	0.33
March	86·4	72·2	79·3	29·82	29·70	29·76	0·25
April	91·1	77·2	84·15	29·72	29·61	29·66	0·29
May	94·16	81·83	87·99	29·56	29·46	29·51	2·98
June	91·2	81·16	86·09	29·52	29·42	29·47	5·74
July	88·7	81·6	85	29·48	29·40	29·44	10·88
August	91	79·	85·1	29·61	29·32	29·485	8·03
September	88·6	81·7	85·1	29·44	29·35	29·397	10·84
October	83·6	77·4	80·5	29·68	29·58	29·630	2·88
November	81	73	80	29·81	29·71	29·764	2·59
December	74·1	58·0	66	29·82	29·75	29·785	0

N. B.—0·207 to be added to above Aneroid observations, to make them equal to Adie's Barometer readings.

The rise and fall of the Bhaugiruttee very closely affects the question of public health at Berhampore. The Executive Engineer, Mr. Wickes, placed at my disposal the river-gauge records of past years. As the books in which the said records appear are now old, and as it is a matter of considerable importance that the past history of the river should not be lost, I have had its varying levels for the last fourteen years carefully charted.* It is much to be desired that the rise and fall, according to season, of all the rivers of Bengal, should be carefully placed on record. The very great importance of such observations, in their relation to the development of disease is becoming more and more recognized.

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* These charts will be found at the end of the volume.

It is a fact of some interest that the heavy rain-fall of the year did not obtain throughout the Berhampore district. It has been remarked that the amount of rain for the year was much above the average in Calcutta, whilst in Tirhoot and elsewhere it was below the usual standard; here as Dr. Fleming observes, the standard varied within the limits of a single district. All Dr. Fleming's suggestions, regarding local conservancy, ought to be carried out. Act XX of 1856 is the only Municipal Act in force at Berhampore, I believe it is in contemplation to introduce Act III of 1864, or Act VI of 1868. On sanitary grounds this would be advantageous. The objection to the Penal Code is that every case of nuisance must be treated judicially. Summons must be issued; evidence must be recorded; and the grounds of decision must also be formally given; witnesses for the defence must be examined. The proceedings connected with the enforcement of the sanitary or conservancy provisions of the Code involve much time and difficulty, the great advantage of the other Acts being that members of the various Committees, in virtue of the executive powers with which they are invested, and of their right to punish summarily, can greatly assist the Magistrate in the performance of duties connected with conservancy, and this with but little trouble to themselves. The appointment of a Cantonment Magistrate at Berhampore would be a step in the right direction. At present the Joint Magistrate has judicial control in matters of conservancy connected with the military cantonment. A complaint being sent to him, he would issue a summons, if *primâ facie,* he considered the offence to come under the cantonment rules and regulations, and he would try the case according to the rules of the Criminal Procedure. Such divided responsibilites as obtain at Berhampore are open to great objection, and I think the conservancy of the place would be improved if the authority of a Cantonment Magistrate was in force within military boundaries, the civil authority being responsible for all beyond such limits. With regard to water supply, the following table, by Dr. R. B. Thomson clearly shows the sources of supply which are least contaminated :—

Summary of analysis of drinking water in use in Berhampore 1867.

SOURCE.	Bhaugiruttee River.	Tank opposite Native Lines.	Well at Native Hospital.	*Kutcha* well at Native Lines.	Lalldiggee tank.	Tank at Police Lines.	Well at Police Lines.	Tank nearest to Native Hospital.	Well No. 2 in compound of European hospital.	Well between old Artillery and Church Barracks.	Well opposite No. 8 Barrack.	Well at back of No. 3 Barrack.	Well between No. 4 & 5 Barracks.
Date of analysis... ...	28th Oct.	30th Oct.	2nd Nov.	5th Nov. ...	7th Nov. ...	15th Nov.	12th Nov.	9th Nov. ..	5th Dec. ..	9th Dec....	11th Dec.	13th Dec.	17th Dec.
Total hardness	5° 35	4° 40	13° 72	23° 38	3° 55	6° 00	14° 72	3° 95	21° 00	13° 16	37° 20	21° 32	26° 88
Permanent ditto... ...	2° 73	2° 27	5° 45	5° 90	1° 50	2° 45	4° 00	2° 09	70° 50	4° 5	8° 00	4° 45	7° 00
Removeable	2° 62	2° 13	8° 27	17° 48	2° 05	3° 55	10° 72	1° 86	13° 50	8° 68	29° 20	13° 87	19° 88
Reaction before boiling ...	Alkaline ...	Alkaline ...	Alkaline.	Alkaline ...	Alkaline ...	Alkaline ..	Alkaline.	Alkaline ...	Alkaline ...	Alkaline ...	Alkaline ...	Alkaline	Alkaline.
Reaction after boiling ...	Alkaline ...	Alkaline ...	Alkaline,	Alkaline ...	Alkaline ...	Alkaline ...	Alkaline.	Alkaline ...	Alkaline ..	Alkaline ...	Alkaline ..	Alkaline	Alkaline.
Grs. Oxygen required to purify 1000... ... grs.	·00107	·00252	·00155	·002405	·00265	·00240	·001010	·002330	00082	·00100	·00060	·00068	·000745
Nitric acid per gallon ... grs.	None ...	None ...	None ...	None ...	None ...	1·5	3·5	None ..	None	1·00	2·00	3·75	2·50
Total solids per gallon grs.	13·055	7·35	38·15	81·900	7·105	10·69	31·045	8·540	46·90	26·95	51·80	20·40	34·30
Combustible matters ... grs.	1·26	1·19	3·150	3·50	1·505	1·89	5·845	2·940	1·75	1·4	2·10	1·75	1·40
Mineral matters ... grs.	11·795	6·16	35·00	78·400	3·600	9·80	25·200	5·600	45·15	25·55	49·70	27·65	32·90
Earthy salts, &c. insoluble in water	8·995	4·375	17·50	33·810	3·5	7·56	16·10	3·360	27·30	14·70	26·25	17·50	18·90
Carbonate of lime ... grs.	3·675	3·150	12·425	25·059	2·0650	5·075	13·930	2·065	19·800	10·95	24·010	14·630	14·25
Silica ... ... grs.	3·15	0·445	0·525	0·35	0·805	1·05	2·1	0·210	1·40	1·57	1·12	1·855	1·645
Salts dissolved by water grs.	2·800	1·785	17·50	44·590	2·1	2·240	9·10	2·240	17·55	10·85	23·45	10·15	14·00
Chloride of Sodium ... grs.	0·630	0·840	14·70	32·2875	0·945	1·130	4·725	0·630	13·125	8·085	18·060	7·14	3·360
Chlorine ... ... grs.	0·381780	0·21744	8·9075	19·3515	0·56267	0·6872	2·86335	0·38158	7·9537	4·799510	10·9443	4·326	2·030
Sulphate of Soda ... grs.	0·384930	0·74155	0·96155	4·8630	1·28310	0·3580	0·96232	0·513240	2·9196	1·8331	1·96890	1·22194	1·60387
Sulphuric Acid ... grs.	0·221700	0·36120	0·5390	2·63655	0·72240	0·53655	0·54160	·28256	1·86600	0·80930	0·794642	0·68628	0·9030
Alkaline Carbonate ... grs.	·8085	0·121660	0·8085	0·8852475	0·8260	0·5250	1·6415	0·64680	1·46195	1·26669	2·663640	1·42695	1·23639

Dr. Fleming complains that the river is much polluted by dead bodies being cast into it. The Police have not yet received orders to report persons so doing, for punishment under Section 290 of the Penal Code; and the Union is said to be too poor to entertain a proper establishment of *Domes* or to furnish fuel. for the burning of the corpses of paupers. There is only one *Dome* in the Gora-bazaar Sub-district, who merely pushes on dead bodies when they are accidentally obstructed in their course down the river., It is very evident that such arrangements are most unsatisfactory. Persons casting the corpses of human beings or the carcases of animals into the river ought to be prosecuted under Section 190 of the Penal Code,—such a practice being likely to cause serious annoyance and injury to the general community. A special establishment of *Domes* should be entertained for the purpose of properly disposing of cast-away bodies. Every corpse seen floating on the stream should be removed to the shore, and there be either buried or burnt. Such cremation or burial of the body should occur at the opposite side of the river from the station. A party of *Domes* should be placed immediately above the town, on both banks of the river, and another party a mile higher up the river. The special duty of these men should be to keep a look out, at all hours, for corpses either floating on the stream or carried by currents against the banks. Every corpse when seen should at once be removed from the water; it should not be sunk in the stream; if not decomposed it should be burnt: if decomposition has set in, it should be buried without delay. The establishment of *Domes* should be supervised so as to prevent carelessness or extortion. The Police should also be required to keep watch at the different *ghâts,* to see that bodies are not thrown into the river. They should be particularly vigilant in this respect during the hours of darkness. The bodies of paupers should be disposed of at the public expense.

Dr. Fleming's suggestion as to the construction of public latrines should be acted on. The deposit of the refuse and litter of the place is not properly attended to, slaughtering should be prohibited in butchers' houses. Such tanneries as are objectionable should be removed to a distance. The sale of decaying fish should be prevented. Dr. Fleming reports that no vaccination is carried on *in the district*; the two men employed at Berhampore and Moorshedabad cannot be nearly sufficient.

The fact noted by Dr. Fleming as to the value of the *papya* fruit, in the treatment of enlarged spleen, is well worthy of attention. It would be well if Civil Surgeons would give a fair trial to this remedy, which is so common in malarious districts generally. On enquiry I am informed that the fruit should be three-fourths ripe; it is cut in slices and eaten with Lahore salt. Its effect is said to be wonderful in some cases,—chiefly in young persons—and good results appear within a few days. I have heard that the *papya* is liable to produce miscarriage.

7.—FURREEDPORE.

This report is a very good and careful one, and most creditable to Dr. Bose.

It is well worthy of note that in the district of Furreedpore, which is excessively humid, cholera very seldom appears as an epidemic. Sporadic cases occur all over the district in the hot dry months. But, according to Dr. Bose, only one epidemic prevailed during a quarter of a century. The epidemic at Syedpore in November 1867, seemed to be due to overcrowding and fouling of water after the cyclone, and the disease did not spread.

Another very noteworthy fact is that in this district epidemic small-pox is almost unknown. The climate seems to be too moist for the requirements of the disease. During the prevalence of cholera in March, April and May 1868, the mean monthly temperature was high.

The silting of the river Chundona is noted as a cause of sickness. The fish market complained of by Dr. Bose ought to be looked to. Vigorous inspection might check the great adulteration of milk referred to. It would be well if the drainage of the Police Lines and of the ground to the south-west of the place for fairs, was improved. The burial of the dead so close to the living should be prohibited. It is to be observed that Dr. Bholanauth Bose, who well understands the subject, alludes to the practice of native *kobirajes* as "a huge, complicated, rude humoralism."

I would draw particular attention to Dr. Bose's remarks on the subject of the value of *bhaunt* (Clerodendron Viscosum) as a febrifuge and anti-periodic; to the virtues of *indrajob* or *koorchee* (Wrightia Anti-dysenterica), and to the therapeutic effects of *harra* (the Black Myrabolan of Bengal.)

8.—BURRISAUL.

The report is a good and careful one. It is pleasing to know that improvements have occurred in the condition of the station. This would appear to be due to the efforts of the Municipal Superintendent. Gonorrhœa and syphilis being so very common, it is a question whether Lock Hospital arrangements might not be enforced. Inspection should be made of the spirits sold in the bazaar. Might not *mehters* be imported from

Calcutta or even from the North-Western Provinces? The *Chumars* complained of by Dr. Mathew should certainly be ejected from their present objectionable position. The sale of decaying fish should be vigorously opposed. Cholera records should be carefully kept in future. It will be observed that Dr. Mathew considers that fairs have not often been found to be a cause of disease. It is interesting to note that small-pox has not been prevalent during the past six years; nor has any serious epidemic of cholera prevailed for five years. The great moisture of the climate seems to be unfavorable for the full development of the disease. It chiefly occurs in March and April, when the river and tanks are very low and more than usually defiled by the people.

9.—DACCA.

The reports from this station are most valuable; one is by Dr. J. T. T. Wise, who has gone to England on medical certificate, the other by Dr. H. C. Cutcliffe, now officiating Civil Surgeon of Dacca. The statements embodied in these documents are most emphatic, and point to a condition of things well worthy of the anxious consideration of the Government. It would be superfluous for me to write at any great length regarding the professional ability and personal zeal of the two Medical Officers whose reports are now under consideration. Their names, I feel assured, are sufficient guarantee to the Government that the facts which they adduce have been carefully enquired into and truly stated. Black and unsatisfactory, to the last degree, as is the picture of the present condition of the town of Dacca, as conveyed in these reports, His Honor the Lieutenant-Governor may rest assured that the representation is strictly exact and unexaggerated. I have myself visited Dacca and remained there sixteen days. During that time I carefully inspected all parts of the city and made myself familiar with the constitution of the Municipality and with the history of its operations. From direct personal knowledge I can bear testimony to the absolute accuracy of the Reports now under consideration; and being able to do so, I feel it to be a very important duty to bring the subject prominently to the notice of the Government. Dr. Cutcliffe characterizes Dacca as "ill-ventilated, un-drained and reeking with human ordure and filth of every description." He remarks that a pestiferous *khâl*, fœtid swamps, foul tanks, stinking drains, and un-controlled jungle exist in the very midst of the population. He states that "the well water of the city is horribly polluted; that the water of the river is also greatly fouled; that general conservancy is entirely neglected; and that, as a consequence, cholera, dysentery diarrhœa and fevers are very prevalent." Dr. Wise's reports, whilst they are admirable for their careful accuracy and breadth of view, present us with a terrible picture of the loathsome conditions under which people live and die, when every law of sanitation is disregarded and despised. It is hard to say which is the most alarming part of Dr. Wise's revelations, and yet all his evidence is cautiously and carefully balanced, and strictly based upon undeniable facts. His testimony goes to prove that almost every conceivable insanitary abomination is, and has been for many years, in active operation at Dacca, to the inconvenience and discomfort of its inhabitants, and greatly to the detriment of human life. Dr. Wise remarks that so far back as a century and a half ago, Dacca had acquired unenviable distinction for its uncleanliness; that certain partial improvements have been carried out: but that at the present time the health of the city is seriously deteriorating. The last noted fact is one of great moment, and demands most anxious attention. Further Dr. Wise writes "the Dacca Municipality is the only one in this district, and its failure, as a sanitary body, is most signal." In many reports Dr. Wise has pointed to the fact that vast fœcal accumulations are left unremoved, that the amount of filth is in consequence steadily accumulating throughout the city; that numberless open drains exist (in the midst of a dense population) without any outlets, which are in point of fact simply stagnant filth-troughs and receptacles of poisonous matters; that cess-pools and well-privies, hideous and dangerous as such things must ever be, are commonly to be found in close proximity to wells; that drinking water is, in consequence, greatly contaminated with the products of the decomposition of human ordure, and loaded with poisonous organic animal matter; that there exists a highly unsatisfactory condition of tanks and water-courses,—these being tainted with the refuse of hide manufactories, and the like; that stagnant shallow pools are to be found on all sides, generating disease; that there is an increase of jungle in the northern parts of the town; and that in the same direction marshes exist which it has never been attempted to drain; that in certain parts of its eastern limits, " nothing but raised mounds, with stagnant pools around, are left to mark the site of former prosperity and wealth;" that many of the bazaars and dwelling houses are terribly overcrowded and ill-ventilated; that the Mahomedan dead are buried at the depth of four feet from the surface, within the precincts of courts adjoining dwelling houses, in the midst of the most densely inhabited quarters, or not unfrequently on the edges of tanks; that diseases of an asthenic type prevail; that in the district, villages "are becoming buried beneath the heaps of accumulated filth that has been generally increasing for ages"; that rivers are silting up, which formerly carried fertility and a wholesome water supply to populous districts; that the closure of the Boorigunga river itself is threatened, which, if it happened, would simply ruin Dacca; that fever and spleen are desolating the villages around; that bodies are staked through the abdomen and left to undergo decomposition, actually at *ghâts* where drinking water is commonly drawn; and that cholera is endemic to the town and district, raging with great fatality, as a rule, twice during the year, *i. e.*, at two distinct seasons. Further a pestiferous tidal creek passes through the very heart of the town; in the bye-lanes, "spouts pour down the sewage of the upper rooms to the ground below"; and "in houses with an interior quadrangle, the open square is used as the receptacle of all the refuse of the house." Lastly, the whole of the sewage of the town which does not soak into the soil is ultimately washed, by natural rain-fall, into the river, the waters of which are also systematically polluted, by having human corpses and the carcases of animals hourly cast into the stream.

Such statements as the above are most disheartening; and yet I believe the only way in which the evils described can be removed, is by looking straight at the facts, and in no degree blinking what really exists.

During the last year, a worthy citizen of Dacca memorialized the Government regarding the very filthy and unsatisfactory condition of the city. He complained that the back lanes abound with excrement plainly visible, and of course very offensive. The Magistrate under instructions from Government, enquired into the matter and was led to believe that such a statement was "scarcely in accordance with fact," but the truth remains that the memorialist was quite correct, and that the evil did and does still exist, beyond all shadow of doubt or dispute. The back lanes and alleys of the city are greatly defiled by the people. The memorialist states that causes of disease abound "in direful and needless profusion," and he complained that "the rate-payers find not only money out of their pockets, but filth and disease at their doors. He petitioned that a special report might be called for from the Civil Surgeon of the station, that "municipal appliances, aggressive and restrictive" should be put in force, and that there might, to general advantage, be a public audit of municipal accounts. These suggestions appear very reasonable and proper.

The Magistrate (Mr. Graham) in reporting to Government, did not seem to acknowledge the truth and force of the memorial above referred to, yet he conceded that "the result of augmentation of filth has doubtless caused the deterioration of the sanitary condition of the city; and the consequence must be that the soil and water become yearly more impregnated with noxious matter." He also allowed that Act III of 1864, since its introduction, "had not been enforced with sufficient firmness against individuals, partly from a disposition to leniency on the part of the Commissioners, and also from a want of energy in the native agency employed." The Revd. Mr. McKenna's memorial was based on a true statement of facts. He complained of the amount of excrement lying about the back-lanes of the city, and well might he do so. Beyond the very limited influence of a superficial and flimsy system of conservancy, confined to a few main thoroughfares, almost everything in Dacca, as looked at from a sanitary point of view, is noxious and objectionable. Mr. Graham, who has lately taken an active interest in urging the necessity for sanitary reform, (having probably come to know the actual condition of the city better than he did a year ago) now writes that some members of the Municipal Commission regard *"its lamentable state of filth and unhealthiness as hopeless."* Everything that I saw whilst I was at Dacca, fully corroborates the reports of Dr. Wise and Dr. Cutcliffe, as also the statements adduced in the Revd. Mr. McKenna's memorial to Government. With Mr. Macbean, the Secretary to the Municipality, who very kindly accompanied me, I visited *Kobiraj-ka-Gully,* Islampore, Tantia-bazar, Malitollah, Armenian-Tollah, Aga Saduk Bazaar haut, Narraindia Khâl Ekrampore, Luckee's Bazaar, &c. I also saw Sindabahu-koocha and Sucha Pundah Gully. With my friend Dr. Wise, I went to the various places of cremation, and inspected all the public latrines in the city. With the Revd. Mr. McKenna and with Mr. Kemp the Editor of the "*Dacca News,*" who takes genuine and active interest in all sanitary questions relating to Dacca, I went through certain back parts of the town; such as Kutta-bazaar, where we discovered sixteen privies within a radius of thirty yards, all pouring sickening streams of feculence on the soil around. Much the same state of things was found at Putta-ka-Gully and in many other directions. I also went to see Begum Takoor's tank, now the property of a *Byragee,* whose *Akhara* (residence) is on its bank; on approaching this spot, which was I believe referred to in Mr. McKenna's memorial to the Government, an old woman was heard gratuitously exclaming:—"*Sahib pawnee burra bo kurta* " a remark curiously bearing out Mr. McKenna's statement regarding the said tank. I drew a bottle of water from the least dirty part of it, and found it excessively impure. Of the latrines which I visited with Dr. Wise, one (in the Begum-bazar) was found within thirty yards of the jail wall, I was told that it had, within ten days of our inspection, been closed by order of the municipal authorities. This place was in a truly loathsome condition ; the latrine compartments had no covering, the surrounding space was utterly neglected ; a mass of mouldy ordure, one foot deep and covering six square feet, damp with the dews of night, was just coming under the influence of the morning sun ; excrement was on all sides, it was difficult to pick one's steps, so as to avoid the filth, and there were also lying about branches of trees, leaves and vegetable refuse in abundance. What must such a place be in the rainy season? The owner of the establishment said he could not get sweepers to remove the filth. Such, under the circumstances, was clearly a duty of the municipal body, who were probably ignorant of the existence of this single nuisance where there are so many. The second latrine visited (at Rahamatgunj) was much cleaner than the first: the privy itself was evidently attended to, but in one corner was a cesspit filled with *excreta,* with a light covering of earth; a stick, put into the centre of this by a sweeper, sank a yard deep in human ordure. The third latrine visited was situated between Rahamutgunj and Chandny Ghât, and the fourth was at Chota Kutra. These were smaller than the others, but tolerably clean, and capable of being kept absolutely so by a little outside supervision. The filth from all the public latrines is said ultimately to be taken to the river.

Mr. F. Simson, the Commissioner of the Dacca Division, kindly drove me about the main streets of the town. These are kept tolerably clean, and it is a fact that certain municipal improvements have occurred in the place. Clearances were made for the new cutcheries; the river bank has been walled for a long distance in front of the town; the Dolye Khâl has in a manner been embanked, public latrines have been established, water casks are in use, &c. On the main thoroughfares some sweeping is done every morning, and flagrant nuisances are prohibited. But if we go into the smaller streets and lanes, on all sides we have to encounter the most nauseating abominations; we find sewage matter either fermenting on the surface of a loose porous soil and so breeding cholera before our eyes; or we know that, after having contaminated the atmosphere, it soaks into the sub-soil and into wells the water of which the people drink. In such places cleanliness and all sanitary laws are utterly disregarded; every day the amount of pollution increases, the scene is disgusting beyond description; an intolerable stench prevails, putrid organic matter densely surrounds the basements of all dwellings, ventilation is most imperfect, the sub-soil water is fecalized to saturation, the appearance of the people is such as results from unhealthiness, depravity and degradation; disease is of a typhoid and putrid type; *cholera has never been absent a single year since* 1817, and to the public shame, it must be confessed that such a state of things has been going on unchecked for more than a century. Well, indeed, might Dr. Wise assert, that "a blight has fallen on this once flourishing place," a blight of the worst description, such as results from the culpable apathy of generations of men. Of late the Government officials at Dacca have evinced real anxiety to improve the place. Something, it is to be hoped, will be done in earnest; yet it is to be remembered that up to date, Dr. Cutcliffe affirms that Dr. Wise's reports have been "utterly fruitless in practical results." He also truly adds—"a complete system of sanitary reform must be undertaken" for Dacca. Dr. Cutcliffe has done valuable service to the community of the place, by pointing out exactly what ought to be done. He recommends the raising of a Municipal loan, opening out of new streets, increase in the number of public latrines to be worked on the dry-earth system, the careful selection of a place for the deposit of all filth, cultivation of ground and utilizing of all excreta; the establishment of a municipal model farm, the extension of municipal boundaries, so as to thin out the population, the clearing of open places within the city, as ornamental public gardens; the closing of all old cemeteries; the construction of a new market-place, and of proper slaughter-houses; the better lighting of the streets, with kerosene; the adoption of measures against the ravages of widely prevailing venereal disease; the improvement of water-supply; the deepening or levelling of the Dolye Khâl; an efficient system of drainage; rooting up of jungle in the city; systematic and careful registration of births and deaths; a revised code of municipal bye-laws; the appointment of an inspector and two sub-inspectors of nuisances; the importation of sweepers; the appointment of a special Engineer officer for the execution of sanitary works at Dacca, and lastly, the employment of prison labour for the general improvement of the town.

Thus, it is to be remarked, that Drs. Cutcliffe and Wise have both most ably shown, not only what a dangerously insanitary condition is that of Dacca at the present time, but also what ought to be and must be done, if the place is not hopelessly to be abandoned to irrevocable decay.

Three great facts must be borne in recollection :

(*a.*) The general health of the town and district is seriously deteriorating from preventible causes.

(*b.*) Very, little, if any, excrementitious matter is systematically removed from the city.

(*c.*) It all either soaks into the soil and into wells or passes with surface drainage, after rain-fall, into the river.

It is also to be remembered that, within the last fifty years, the population of Dacca has fallen away very much ; and that (now the Railway is gradually nearing the place,) the difficulties of sanitation (as pointed out by the Commissioner of Dacca in his letter No. 101 of 27th April 1868) will go on increasing.

The time has come when something should be done vigorously; delay will only increase existing difficulties. Mr. Graham, as Chairman of the Municipal Commissioners of Dacca, not long ago, submitted a Minute to the Government, in which he endeavours to show how a larger supply of public money might be raised at Dacca, and how, were a municipal loan instituted, or sanitary objects, it could be paid off. The subject is a difficult one, and of so special and technical a character, that I do not feel justified in expressing any strong opinion regarding it. Financial Officers can best advise on points of detail in such a matter. But I may here state, that I am personally very strongly impressed with the necessity of a public loan being raised for the improvement of Dacca. Without such a loan I can perceive no hope of measures being carried out necessary to restore the place to a condition of healthful cleanliness, but much could be done if a loan of four or five *lakhs* of rupees were now raised. I think that for half a *lakh* the city might be rendered tolerably clean; and then probably about ¼ of a *lakh* a year would be required for conservancy purposes. So much I can say. What an efficient system of drainage would cost, or a proper water-supply, I cannot venture to estimate. Experienced Engineers could alone do this; but that such measures as good drainage and improved water-supply are extremely and essentially necessary is most certain. The laws which exist should be enforced. Such clauses as the following, which I have extracted from the "Municipal Bye-Laws for the city of Dacca, under the provisions of Act III of 1864, B. C." may at present be regarded as practically a dead letter:

33. "No person shall perform any office of nature in any places (outside private premises,) other than such as may have been appointed by the Commissioners, provided that such places have been set apart by the Commissioners."

35. "No person shall make the door of any private privy to open directly on any public thoroughfare; and any person having the door of his privy so constructed, shall alter it upon receipt of notice to that effect from the Commissioners."

37. "No person shall suffer any offensive matter from any manufactory, place of buisness, stable or cook-house to flow into any river, *nullah,* canal, tank, or surface drain."

Penalty for infringement, Rupees 20; penalty for continued infringement after notice, Rupees 5 daily."

38. "No person shall keep filth, dirt, dung, bones, dead bodies, rubbish, or other matter of a noisome kind, for more than twelve hours, in such a place or manner as to cause annoyance to any person, or injury to the public health.

Penalty for infringement, Rupees 20."

46. "No person shall dispose, or cause to be disposed of any corpse, or any part of a corpse, otherwise than by burning or burying it at or in some lawful burning or burial ground.

Penalty for infringement, Rupees 10."

The first thing to be done is to carry out a thorough general clearance and purification of the city, by scavengering. The whole place should be divided into blocks; and the worst attacked first. A proper disposal of town sewerage must then be provided for. I do not at all agree with Mr. Graham in the opinion that burying the night soil of the city in trenches, at a distance, would be a source of danger to public health. Such a fear seems to me groundless; particularly if cultivation be practised, as ought to obtain wherever night soil is deposited. The water of the river must be studiously and anxiously conserved from all pollution; the banks of the river must not be defiled, and the casting of dead bodies and of carcases into the stream should on no account be permitted. Severe penalties should attach to the casting of city ordure and refuse into the river, which is now simply a large public sewer. An Engineer Officer should see carefully to the state of the Boorigunga, and report to the Government if there is now any fear of its course being obstructed by the formation of a *chur*, and if so, what can be done to prevent such an occurrence, which would be fatal to the general interests of the place. The city should be opened up as much as possible by the Magistrate; of course this could only be done gradually. As proposed by Dr. Cutcliffe, municipal limits might be extended, so as to thin out the present purlieus and to render conservancy attack more easy. The questions of drainage and water-supply should be referred to trustworthy special authorities on those subjects. A much improved conservancy establishment must be organized, with reliable inspectors, and a thoroughly working staff. There must be a large increase in the number of public latrines, and they must be properly organized. Special burial grounds must alone be used by the Mahomedans; and well selected places of cremation should be set apart for the Hindoos. The question of what should be done to the Dolye creek is a very difficult one. On purely sanitary grounds it would undoubtedly be advisable to close it altogether and, by filling it in, to bring it, as nearly as possible, on a level with the surrounding localities. In its present state it must always be a source of great danger to public health. If local interests stand in the way of its being levelled, it should most certainly be deepened, and the banks turfed.

At present, something like Rupees 6,000 is all that is annually allowed for the conservancy and sanitary improvement of a town about three miles in length and about half a mile across. It is idle to suppose that a filthy city can be properly dealt with on such parsimonious principles. It seems to be a disputed point whether the population of the place is 50,000 or 80,000. By a careful determination of this point, and by a proportionate re-valuation of assessment, it is possible that more money may be available than is now at the disposal of the Municipality. I cannot presume to enter into the Financial question, but I can confidently affirm that the present allowance for conservancy purposes at Dacca is altogether insufficient. Money should be raised by loan, and every recommendation that has been made by Dr. Wise and Dr. Cutcliffe should, as far as possible, be carried out. Those gentlemen deserve great credit for the zealous manner in which they have gone into a subject surrounded by more than ordinary difficulties.

A short time ago a Memorandum by the Army Sanitary Commission in England was forwarded by His Grace the Duke of Argyle to his Excellency the Right Hon'ble the Governor-General of India in Council, on the subject of the prevention of Cholera in India. The memorandum referred to concluded thus:

"In the present state of the question no greater service could be rendered than by the Madras and other Commissions being allowed to carry out, in well marked endemic localities, measures of a similar class to those so successfully adopted at Conjeveram pilgrimage.

For instance, let a well marked endemic locality be selected in each Presidency, and let a thorough enquiry be made into its sanitary state, including—

(*a*) Surface and subsoil drainage, marshes, malaria;

(*b*) Surface cleanliness, and cleanliness of compounds and houses;

(*c*) State of adjacent country and under-wood nuisances;

(*d*) Habits of the natives, especially as regards food, disposing of excrementitious matter, and the like;

(*e*) State of the water used for drinking and cooking;

(*f*) Amount of cholera.

Then let a rigid system of sanitary police be adopted to ensure that the people have the use of pure air and pure water, by removing every thing which interferes with these requisites, and let the results to health be recorded.

Points of this kind are included in our instructions referred to, but if special cases be selected and dealt with, many of the questions would be at once put in the way of being solved."

This is a most valuable suggestion. At Dacca is an endemic "home of cholera," than which none more characteristic could be required. Careful sanitary surveys of the place have been made; we are familiar with the localizing causes of disease which are now in full operation. A rigid sanitary system should be initiated, the results of which must be of great value not only to Dacca itself, but to the world at large. The Government has the advantage of a Medical Officer being on the spot, whose administrative and executive powers are of an unusually high order; and indeed, in this respect, local sanitary reform could not be inaugurated under more favorable auspices. I sincerely trust that the Government will direct and enable the civil authorities at Dacca to realize money, and otherwise to enter upon such practical measures as will convert a place of great importance, which is now established *nidus* of cholera, and of diseases of a low, malignant, typhoid type, into a reclaimed, specimen city; wherein, by order, system, and scientific appliances, at wasteful sacrifice of human life may henceforth be averted, and a good instance established of practically successful Indian sanitation. In the words of the Sanitary Commission, "let a rigid system of sanitary police be adopted to ensure, that the people have the use of pure air and pure water, by removing everything which interferes with these requisites, and let the results to health be recorded."

10.—MYMENSING.

The report, by Dr. Henry Wilson, is an excellent one.

The notes on cholera are careful, and very suggestive.

The unhealthiness of the district is said to be increasing; chiefly at those parts distant from the Berhampootra and Jamoona. It is within my knowledge that the subject of the drainage of Mymensing has lately engaged the attention of the Government. The alteration in the course of rivers, the formation of *churs,* and the silting of *khâls* are cited as causes of unhealthiness. I believe such causes have heretofore attracted too little attention in Bengal. In autumn, during the drying season, shallow *khâls*, and the exposed beds of minor water-courses, become the seed-plots of pestilence. Such an effect is liable to be produced in every alluvial tract, where the formation of new lands goes on. "Such geological changes," writes Macculloch, in his great work on Malaria, "are the chief causes of those revolutions in the public health which, from the testimonies of history, have occurred since the classical times, in Italy, and probably, in Greece," (p.—202.) The work now quoted from, although it was published in 1827, insists particularly on the generation of malarious disease by alterations in the course of the Ganges and Brahmapootra (*vide p.* 196.) So, Sir Ranald Martin tells us (p. 36) that threehundred and fifty years ago the Sunderbuns was a well-peopled country, now desolate, in consequence of "the gradual process of silting at the heads of many of the rivers."

It is very interesting to observe that goitre "is very prevalent in the North-Western parts of the district, the inhabitants of which are supplied with water from the streams running down from the Garrow Hills." Mymensingh itself has a laterite soil covered with sand; and "laterite clay forms the bed of the Brahmapootra" (McClelland's *Medical Topography of Bengal, p.* 19)but the streams coming down from the Garrow hills pass over limestone, and hence probably the disease. This fact is interesting, in connection with McClelland's researches into the causation of goitre and cretinism in Kumaon. The disease also occurs in the Dacca District, where the waters of the Brahmapootra pass into the calcareous channels of the Panar and Luckya (*vide* Taylor's Topography of Dacca, *p.* 337.)

Cholera, in the Mymensing District, seems to recur chiefly in April and May, and in November and December. In some cases Dr. Wilson believes it to be imported by pilgrims from Moorshedabad or elsewhere; at other times the pollution of tanks and *khâls* seems to have some relation to its development. In a letter, dated Mymensing the 23rd December 1868, Dr. Wilson reported specially on the epidemic which had been prevailing in the south-eastern parts of the district. The outbreak made its first appearance on the 9th November, in the neighbourhood of Attea in the south-western part of the district. On the 17th instant it had appeared "in the neighbourhood of Kishoregunge in the south-eastern part of the district." Dr. Wilson went out into the district; he first visited Madareegunge(a place surrounded by thick jungle, and with a dirty, stagnant water-supply;) thence to Hooshikallie, four miles distant, a similarly insanitary place; after this to Jungalea a small bazaar about nine miles south-east of Madareegunge; thence to Hanihampore and Kishoregunge. On one side of the Kishoregunge *khâl*, the water of which was very dirty, lie a succession of small villages in the midst of dense jungle, the inhabitants of which obtain their drinking water from the *khál,* in which they also bathe." In these villages cholera was most rife. It had also caused a high mortality here in 1866. At Junglebarrie where the people also drank the foul water of a *khál* from 90 to 100 persons had died within five weeks. Dr. Wilson thus sums up his observations on the subject.

"It was evident, on comparing the dates on which the cholera had broken out in the different villages through which I passed, that it had commenced at Jungulbarrie, and the disease could not have chosen a spot more favorable to its development and spread. Dense jungle interfering with free ventilation, and bad drinking water, were here present to an unusual extent, and it is noteworthy that amongst those who drank from the one tank before mentioned, no case of cholera had occurred.

The cholera took its course down the *khál,* attacking principally those villages on the bank of the *khál* which was most thickly planted with jungle, and the inhabitants of which obtained their drinking water from the said *khál.*

These facts seem to show how readily the disease spreads through the medium of water, and also how its extent is influenced by the insanitary conditions before noticed.

From Jungulbarrie the disease spread to Kishoregunge, and so on, to the neighbourhood of Haushanpore, which latter place, though not situated immediately on the Kishoregunge *khál,* lies close to its mouth.

From this point on to Madareegunge the disease prevailed to much less extent, and had probably spread through the medium of ordinary human intercourse.

One must, however, look deeper for the causes of this particular outbreak, and I believe those causes are connected with some atmospheric conditions which have produced an unusually unhealthy season. The natives attributed this unhealthiness to the want of rain in the beginning of November, also to the great prevalence of the wind from the east and south-east, instead of from the north.

It is worthy of remark that this year the *kháls* were unusually high, and dried very quickly, leaving a great amount of marshy land; this was the case to a still greater extent in 1866, in which year, as I before stated, the outbreak of cholera in Kishoregunge was very severe. The silting up of the bed of the Brahmapootra river of late years has caused many *khâls* in this district to dry up during the cold season, which formerly would remain comparatively full throughout the year. This circumstance has certainly produced a great deterioration in the water drunk by the inhabitants of the many hundred villages which are situated on these *khâls*, and may help to account for the greater prevalence of the disease of late years in this district at this particular season.

The insanitary conditions of native villages are, however, of too general and constant a nature to allow of our setting them down as the immediate causes of any particular outbreak of cholera in any particular year, favorable as these conditions may be to the development and spread of the cholera poison.

To prevent, or rather to control these constantly recurring outbreaks, I would suggest the following measures, which would certainly remove some of the conditions so favorable to the spread of the disease:—

1. Let the sale of stale fish be strictly prohibited.

2. In such villages as are solely dependent on half-empty *khâls* for drinking water, let one or two good tanks or wells be dug.

3. Let the excessive jungle which surrounds all native' villages be thinned immediately after the rains, to allow of a better ventilation.

These simple measures are, I think, practicable, and I am sure they would be attended with appreciable benefit."

River Engineering and drainage are also evidently much required.

The following is a bright reverse to the usually dark picture:

13. "I will here remark that, having heard a few days ago that there was a bazaar about twenty miles from the station in which there had been no cholera for twenty years, I rode over to investigate the spot. I found the bazaar a small one, containing about 150 inhabitants; it was situated on rather high ground; the soil contained a considerable amount of clay, and there were two very fine tanks which had been dug by two zemindars in the immediate neighbourhood."

A maximum and minimum thermometer (also a dry and wet bulb) should be supplied for the station of Mymensing; indeed particularly to all the stations of Eastern Bengal, where it is very important that we should have exact and careful meteorological records.

Doctor Wilson's opinion is worthy of note that jute-steeping is not injurious to health. It is much opposed to ordinary belief. The condition of Nusseerabad seems to call for reform; corpses cast into the river "often in the middle of the bazaar," and burials in private compounds indicate an utter want of sanitary control.

The fact of three genuine cases of true *typhoid* fever being reported has no slight medical significance.

The moist climate of Eastern Bengal seems inimical to small-pox; and yet the disease is very prevalent in the Mymensing District. The intended independent efforts of the Municipality with regard to the entertaining of vaccinators are praise-worthy; but it would perhaps be well that anything in this direction should be carried out only after consultation with the Superintendent General of Vaccination. Inoculators may spread small-pox, and yet it would be a most dangerous measure to suppress small-pox inoculation, where vaccination is not well provided for. This is a point on which I particularly insisted in my letter to the Junior Secretary to the Government of Bengal, dated 23rd November 1868, as the following passages show :—

One thing is certain, *viz.*, that the extension of the Act prohibiting the practice of Small-pox inoculation must go, *pari passu,* with the advance of our vaccine system, and that it would be a *most fatal error* to put a stop to inoculation where we cannot substitute vaccination in its stead. I speak now of the system generally. *Under exceptional circumstances, whilst a severe epidemic of small-pox is prevailing,* it may be justifiable to interdict, *for the time being,* the practice of inoculation; but this is very different from prohibiting inoculation by law; "whether there are vaccinators or not." To do so would be to commit one of the greatest errors possible in Indian sanitation. Those who recommend such a measure cannot, I think, fully understand all the bearings of this very important question; and they properly fail to realize to what degree inoculation (troublesome, hazardous, and at times fatal though it be) is an actual safe-guard against the infection of regular epidemic small-pox. Again they probably do not know that properly to vaccinate the inhabitants of Bengal, we should require an establishment of something like 10,000 vaccinators. If they are aware of this fact, and have based their opinion upon it, I wrong them. But I cannot help thinking that there is a vague (and certainly not *altogether* unnatural) prejudice against inoculation, which is, however, chiefly entertained by those who shut their eyes to its positive advantages. And what I would here insist upon, is that in a country so populous and so prejudiced as India, it is of absolute value; and that the Government cannot possibly think of putting a stop to it until the present vaccine system becomes greatly extended beyond its present limits.

The fact must not be lost sight of that about eighty per cent of the people of Bengal are protected from small-pox by inoculation. Were inoculation then to be hastily and inconsiderately prohibited, the results would be very serious.

The Government will, I trust, see good reason for setting aside the suggestions of those who, with true zeal no doubt for the public good; but taking too narrow a view of the different bearings of the subject, recommend hasty and sweeping legislation. In such a matter, by a single ill-judged stroke of the pen, many thousands of lives might be sacrificed, and indeed I express by no means a hasty opinion, when I say that I can scarcely imagine a more certain mode of inducing great preventible mortality than by abruptly attempting, by legal enactment, to abolish the practice of variolation in Bengal.

Doctor Wilson's remarks on the poisoning of cattle are of some importance.

11.—TIPPERAH (COMILLAH.)

The report is a particularly good one, and most creditable to Dr. Greene. The natural insanitary conditions of Tipperah are very fearful; but it is satisfactory to know that since the Municipal Act has been introduced, the condition of the place is somewhat improving, year by year. The people seem perpetually subject either to inundations or to cholera. The question raised by Dr. Wilson of converting the *bheel,* situated to the west of the Police Lines, into a tank might be advantageously referred to an Engineer Officer. A wet and dry bulb thermometer should be supplied. The mean monthly temperature of Comillah seems to be three or four degrees below that of Calcutta. Could not the growth of paddy in the heart of the station be prevented? The adulteration of spirit with *dhatura* seems to be carried to great lengths. It should be interdicted, there is no want of legislation on this point. The occurrence of land scurvy is to be remarked. It is to be regretted, that Dr. Greene did not report more fully on this subject, which is one requiring further elucidation. It is very noteworthy that cholera is said to recur every third year. This has an interesting bearing on certain opinions, such as those of Dr. Bryden, on the subject of re-developments of cholera. The disease is reported to have prevailed in the filthiest of seventeen different *mohullas.* The removal of the burning-ghât from the heart of the town was a step in the right direction. The freedom of the prisoners in the jail from cholera is worthy of remark. The experience of many other districts seems to corroborate the opinion that the careful working of the dry-earth system, the supply of pure filtered water, and the general adoption of hygienic measures is beginning to produce an appreciable effect on the history of cholera in the jails of Bengal. No one could urge sanitary reform more zealously than the present Inspector-General of Prisons, Lower Provinces. Dr. Greene, recommends the quarantining, or rather the *surveillance* of pilgrims. It is to be observed that the Civil Surgeons of Burrisaul, Tipperah, Dacca and Mymensingh, all believe that pilgrims spread cholera.

Goitre is very common at Tipperah, the waters of the small river Goomtee, taking their rise in the Tipperah hills, probably pass over calcareous beds.

Dr. Greene recommends the people to make use of sulphur fumigation where cattle disease prevails ; but it would appear that the importation of sulphur has been interdicted. Political reasons permitting, perhaps the rule might at certain times be somewhat relaxed. I should here remark that, attached to the annual Sanitary Report for Tipperah, a correspondence has been forwarded to me, which passed between the Magistrate and the Civil Surgeon of the station, regarding the systematic pollution of certain tanks. The letters involve personalities ; on this account I omit to notice them further. It is to be hoped that a satisfactory understanding has been come to, and that the interests of public health will be considered paramount.

12.—NOAKHOLLY.

Dr. Durrant's report, is somewhat short and epigrammatic in style ; but it is quite to the point. I feel it to be my duty to draw particular attention to his remarks as to the want of interest and action, evinced in sanitary matters ; particularly as regards drains, tanks, corpses, carcases of animals, brick-making, and illicit distillation of spirit. From Dr. Durrant's report, one might suppose that terrible nuisances constitute the rule, and not the exception. Such a state of things is highly unsatisfactory. The reported condition of the Police Hospital and Barracks merits consideration. Cholera and small-pox do not seem to prevail very generally at Noakholly. The former disease is believed by Dr. Durrant to be non-contagious.

The reported death caused by the fumes from a brick-kiln proves to sad demonstration, the deleterious nature of the trade of brick-making. This appears to be too lightly thought of in India. Mere dilution of a poison is not sufficient. It should be distanced as far as possible. The reference to blood-letting by *kobirajes,* in cases of adynamic fever, points, in all probability, to a considerable cause of mortality, which would never appear in any mortuary returns.

13.—KOOSHTEA.

The report, by Dr. J. G. Grant, is most careful and creditable. The fact is noteworthy that the public health of the place has deteriorated, and fevers have become more prevalent, since the occurrence of silting of the river near the station ; it is also to be remarked that Dr. Grant believes drainage to be somewhat interfered with by the Railway, although culverts have been constructed. This matter should be specially seen to by the Engineers of the line. Ryots should be punished who wilfully obstruct general natural drainage by the formation of *bunds.* Dr. Grant's observations on cholera, go to strengthen the views of Pettenkofer of Munich. Porous sub-soil, excrement, sub-sidence of subsoil moisture, with a high temperature seem to be the elements specially favorable to the development of the disease. Cholera, in epidemic form, appeared on the 20th November 1867, and continued until May 1868 It spread to the North-East; against the prevailing wind, which during the epidemic, was westerly. It ceased after the heavy rain. Dr. Grant's description of a Bengali village gives a correct idea of the reality.

Fairs were not found to be a cause of disease. Dr. Grant's opinions regarding quarantine quite correspond with my own. The Kooshtea vaccination returns are sadly low and unsatisfactory ; Small-pox frequently breaks out. It is evident that the Vaccine Department should have a footing here.

14.—PUBNA.

The report from Pubña is a good one. It is satisfactory to know that the sanitary condition of the place is improving, and that real active interest in the subject is evinced by the Municipal Committee. The jail mortality is remarkably low. A Barometer and a wet and dry bulb Thermometer should be supplied. The question of the possible drainage of the Sonaputha Bheel might be referred to the Executive Engineer.

Public latrines should be constructed; and the Municipality would do well to utilize the filth of the place. The Police should be prevented from throwing bodies into the river. Such bad example is, I am afraid, not peculiar to Pubna. It should nowhere be permitted.

15.—RAMPORE BEAULEAH—RAJSHAHYE.

The report, by Dr. John French, is a very good one. The drainage of the station urgently demands attention. "In the rains," writes Dr. French, "the drains overflow, and in the dry weather they are choked with jungle. No proper drainage exists in any place."

Public latrines ought to be introduced.

It is much to be regretted that the Sanitary suggestions made at different times by Dr. French have not been followed by any decided improvements and that no real interest is taken in conservancy matters. If this continues, the health of the place will go on deteriorating. The tanks seem to be much neglected. The casting of offal into the river should be put a stop to. From personal observations I can state that the butcheries at Rampore Beauleah greatly require to be looked to. Loathsome nuisances exist around them. The strip of land extending between the river bank and the main station road is altogether in a neglected state. It would be a great improvement to the station if this land could be thoroughly cleared of huts and jungle and opened out as a public garden. Brick-making in the heart of the station is objectionable. The rain-fall for the year amounted to 57·17. Dr. French is not quite correct when he writes that during 1868 an unusually high rain-fall occurred throughout Bengal. The places where such did not happen are noted in other parts of this Report. Dr. French's notes on the outbreak of cholera were most careful and creditable. The disease prevailed from March to May, having also occurred in the district during the later months of 1867. As regards the year under report, Dr. French is of opinion that pilgrims brought the disease from Nattore. It was prevailing there about the 12th of March. The first case in Beauleah occurred on the 17th of March, in the person of a pilgrim from Nattore. Cholera broke out in the jail although there was no communication between pilgrims and the prisoners. "It appeared on the same day in two distinct and separate parts of the jail, *viz.*, in the quarantine ward, and in the main jail. The persons so attacked had no communication whatever with any one outside the jail walls. In the prison the ratio per cent of deaths to cases was 64·92, and "the type of the disease was very bad; the attacks were sudden, and the collapse was immediate and extreme."

Dr. French came to the conclusion that the disease was *not personally contagious.* Sub-soil moisture, during the epidemic, was found to be ten feet below the surface. "While the weather was hot and dry, with a north-west wind blowing, the epidemic raged fearfully, and the cases were more fatal. The direction of the wind appeared to have no effect on the disease." The following is Dr. French's record of atmospheric conditions:—

Meteorological Diary showing the number of admissions from Cholera on each day during the epidemic.

DAYS OF THE MONTH.	Number of admissions from Cholera.	METEOROLOGY.						
		Rain-fall in inches.	Direction of the wind.	Maximum temperature of the air.	Minimum temperature of the air.	Mean temperature of the air.	Min. Barometer.	Max. Barometer.
				°	°	°	°	°
28th March 1868	0		W.	87	74	80	29·04	29·82
29th ,, ,,	2		N. W.	90	75	82	29·90	29·92
30th ,, ,,	1		N. W.	88	75	81	29·83	29·92
31st ,, ,,	0		N.	81	80	80	29·90	29·92
1st April ,,	3		N. W.	88	77	82	29·88	29·96
2nd ,, ,,	3		N. W.	86	78	82	29·90	29·98
3rd ,, ,,	3		N. W.	89	79	84	29·86	29·92
4th ,, ,,	2		N. W.	89	78	83	29·90	29·92
5th ,, ,,	3		S.	8	77	78	29·98	29·02
6th ,, ,,	6		N. W.	83	73	78	29·96	29·02
7th ,, ,,	3	0·80	N. W.	79	77	78	29·90	29·98
8th ,, ,,	1		N. E.	82	76	79	29·86	29·92
9th ,, ,,	0		E.	84	76	80	29·84	29·92
10th ,, ,,	0		N. E.	86	77	81	29·76	29·86
11th ,, ,,	1		S.	88	76	82	29·74	29·86
12th ,, ,,	1		S.	89	79	84	29·68	29·74
13th ,, ,,	1		S. W.	90	79	84	29·70	29·76
14th ,, ,,	0		S. W.	92	82	87	29·08	29·70
15th ,, ,,	2		S. E.	87	80	83	29·84	29·86
16th ,, ,,	1		S.	90	82	86	29·74	29·84
17th ,, ,,	2	1·50	S. W.	86	75	80	29·80	29·84
18th ,, ,,	0		S. W.	89	79	84	29·74	29·78
19th ,, ,,	0		W.	90	80	85	29·68	29·76
20th ,, ,,	0		S. W.	93	82	87	29·68	29·76
21st ,, ,,	0		S. W.	95	84	89	29·68	29·74
22nd ,, ,,	0		N. W.	93	83	88	29·66	29·70
23rd ,, ,,	0		N. W.	91	82	86	29·78	29·84
24th ,, ,,	0	0·50	W.	89	83	86	29·84	29·86
25th ,, ,,	1	0·10	S. W.	84	79	81	29·74	29·86
26th ,, ,,	2		N. W.	86	75	80	29·78	29·86
27th ,, ,,	1	0·20	S. E.	88	79	82	29·74	29·82
28th ,, ,,	0		S. W.	92	83	87	29·60	29·76
29th ,, ,,	0		W.	93	84	88	29·64	29·68
30th ,, ,,	1		S. W.	95	86	90	29·62	29·76
1st May ,,	3		S. W.	98	87	92	29·70	29.78
2nd ,, ,,	5		S.	96	83	92	29·80	29·82
3rd ,, ,,	0		S. W.	97	90	93	29·84	29·88
4th ,, ,,	1		S. W.	97	86	91	29·62	29·84
5th ,, ,,	1		S. W.	99	87	93	29·72	29·86
6th ,, ,,	1		N. W.	98	87	92	29·62	29·78
7th ,, ,,	1		S. E.	94	88	91	29·60	29·68
8th ,, ,,	0		S.	89	82	85	29·74	29·80
9th ,, ,,	1		S. E.	86	78	82	29·86	29·92
10th ,, ,,	0	0·35	E.	82	80	81	29·74	29·86
11th ,, ,,	2	1·50	S. E.	82	80	81	29·78	29·80
12th ,, ,,	0		S.	85	77	79	29·80	29·82
13th ,, ,,	2		S. E.	90	82	86	29·80	29·90
14th ,, ,,	0		S. E.	91	75	83	29·86	29·90

Cholera disappeared on 18th May 1868.

The Inspector General of Jails, Lower Provinces, commenting on Dr. French's admirable Report, wrote as follows :—

4. "It is interesting to learn that the outbreak did not originate with the pilgrims, but had apparently a distinct centre of "spontaneous generation" where the pilgrims picked it up. After this they carried it with them everywhere, and caused outbreaks of the disease in all places, and among all persons, where, and in whom the conditions necessary for its communication and extension existed. This fact was observed many years ago in one of the Madras Reports, tracing the occurrence and propagation of cholera among troops on the line of march. The fatal march of Her Majesty's 62nd Regiment is one of the most striking on record.

3. The immediate origin of the outbreak in the jail is not clearly established. It occurred ten days after the appearance of cholera in the bazaar, and nine days after the institution of quarantine. It seems probable that the outside public had access to the tank which is the chief source of the water-supply of the jail; and it is by no means improbable that this may have been the means of its introduction to the prison."

In few, if in any instances has an outbreak of cholera been more carefully observed in India than the one now referred to. Here nothing could be found to support the opinion that the disease spreads by direct contact of individuals. It may be noted that on the 11th of September 1867, the Ganges, rising to an unprecedented height, broke through the embankment in front of the station, and flooded the whole country, (*vide* Letter No. 49, dated 4th June 1868, from the Officiating Commissioner of the Rajshahye Division, to the Secretary to the Government of Bengal.) Dr. Mouat, having just travelled through that part of the country, endeavoured if possible to trace the extension of the cholera outbreak above commented on, to Bograh, Serajgunge and Mymensing. It could not possibly be established that pilgrims took the disease either to Serajgunge or to Bograh. Between these two places, there was "a line of country forty miles in extent, with populous villages on the road" which was free from cholera. The Magistrate of Bograh, reporting on the subject, wrote :—"On the whole, I do not see any grounds for believing that the outbreak in this district had any connection with the Berhampore pilgrimage." The disease broke out in the Bograh Jail, without any traceable connection with the outside population. With regard to Mymensing, the Civil Surgeon and the Magistrate were both of opinion that "the pilgrims from the great *méla* in Moorshedabad brought the disease to their homes, both in the Mymensing and the Dacca District." In contrast to such an opinion, the Assistant Magistrate of Serajgunge wrote to the Inspector-General of Jails, Lower Provinces: (No. 381, dated 15th October 1868) "from all I can gather, I think you may take it as a fact that the passage of the pilgrims through Serajgunge itself was not attended with manifestation of cholera" and "I think you may also take it as a fact that there is no trace now in people's memory of cholera having attended the pilgrims in their passage through this Sub-division."

In summing up, from all the evidence that he could collect, Dr. Mouat wrote as follws: (*vide* No. 5736, dated 1st December 1868, to the Secretary to the Government of Bengal:)

"From all that I was able to learn the disease began again at Nattore, as it had done in the hot weather, and on this last occasion it was said to have been extremely fatal. There was now no stream of pilgrims passing through, and yet cholera made its appearance at the sudder station, among a body of men who had no communication with any infected persons or places.

I have strong reason to believe that at Nattore or in its vicinity there is a formidable centre of spontaneous generation of cholera, which is very mischievous in its effects, and is usually propagated far and wide.

Close to Nattore is the great Chollun *Bheel* covering many square miles of land. I have twice crossed this *bheel,* once in May, and a second time in October, and on both occasions its waters were fœtid and pestilential. I suspect that this is the *fons et origo* of all the mischief, and that it ought to be drained and reclaimed."

This brings me to the subject of the sanitary condition of Nattore itself, upon which Dr. Coull Mackenzie has written a clear and useful report. Before concluding these remarks, however, in relation to Rampore Beauleah, I cannot refrain from stating that Dr. French's incessant devotion to duty led to serious illness, and to the necessity for his leaving India. The interest taken by this Officer in all sanitary matters was very great, and it is much to be regretted that his health too soon yielded to the influence of those insanitary conditions which he was endeavouring so eagerly and so judiciously to rectify.

The following careful report on the cholera outbreak at Nattore in the month of October is by Dr. Coull Mackenzie, the Officiating Civil Assistant Surgeon of Rampore Beauleah. It is much to be desired that Dr. Mackenzie's suggestions should be carried out as far as possible. There can be no doubt that the extreme local uncleanliness of Nattore might to a great degree, be made to disappear. The revolting pollution of tanks, described by Dr. Mackenzie, should be prevented with the utmost firmness. A place must indeed be in a most pitiable state where inundations are considered necessary to bear away its manifold defilements. Such, however, it would appear, is the case at Nattore, a place where we are told "no means whatever are adopted for removing refuse of any kind,"—there being a single inefficient sweeper to look to the conservancy requirements of a large town! The burial of the Mahomedan dead, in a suitable cemetery might very easily be arranged; and the prevention of the sale of decayed fish might also without much difficulty be put a stop to. It is much to be regretted that Dr. Mackenzie could not furnish a meteorological record of the period during which cholera prevailed. I beg strongly to recommend that good meteorological instruments be supplied for Nattore. At present there is only a native doctor there,—a willing, hard-working, subordinate, with a very slight knowledge of English. He must be considered quite unfit to act as a meteorological recorder. It would be a matter of much importance to medical science, if a well qualified Sub-Assistant Surgeon were posted to Nattore, to keep careful notes of all cholera visitations and also to record all meteorological changes. It is in the favourite haunts of cholera that such observations possess a double interest. There can be no doubt that this plague of India comes and goes with definite atmospheric and telluric changes, which have not yet been determined with sufficient accuracy. It is in places like Nattore where this study should be carried on with the greatest eagerness and precision.

Report on an epidemic of cholera at Nattore towards the end of 1868.

By Dr. S. Coull Mackenzie.

"The frequency of the outbreaks of cholera, in an epidemic form, which have occurred in this district, within the last few years, caused me, shortly after my appointment to this station, to enquire whether there might be in the local circumstances of the places where the epidemic assumed the worst type, something to aggravate, if not to cause the disease. While thus engaged I was led more particularly to direct my attention to the town of Nattore, as well from the importance of the place, as from the peculiar severity of the phases of the outbreak which occurred there in November last, with regard to which I have, at the request of the Magistrate of the district, drawn up the following report:—

Nattore is a town situated thirty miles north-east of Beauleah, on the Narud River. It consists of about 7,000 houses, comprised within an area of 1,974 acres, the number of inhabitants is about 16,000. This town was formerly the most important in the district of Rajshahye, and for this reason as well as on account of its very central position, it was created the sudder station in the year 1790. From the records which exist it would seem that at that time the town was built on land, the level of which, in common with that of the surrounding country, was so low, that the inhabitants were subjected to the greatest inconvenience from the yearly inundations, during which it was impossible to move, even from house to house, except by means of boats.

Indeed, tradition, which in this case is corroborated by the very name of the place (*Na-tor,* or " no place") states that in the reign of Aliverdy Khan, this town was founded by Rajah Ramjeebun Rai, as a stronghold on an island in the midst of the Bhodra *Bheel,* which it is only fair to infer, formed at that time a barrier impassable at all times of the year by any invader. Since that time, however, the *bheel* has silted up and ever since the beginning of this century the level of the place seems to have been materially raised, as now on digging down a few feet, remains of the former cutcheries are found. Still, however, considerable depressions exist in, and around the town, filled throughout the year with water, which in the hot season becomes stagnant and with decaying vegetation, becomes the hot-bed of malaria.

The river Narud, on which as before stated the town is situated, having also silted up, is now not the important stream it once was, and in the hot season consists merely of a series of pools, the waters of which in like manner stagnate and contribute not a little to the unhealthiness of the place, continually emitting as they do a noxious vapour, difficult to breathe, the results of decaying fresh-water algæ. During the rains, this stream becomes a very considerable river, navigable by boats of considerable burden. It takes its rise from the Mooshakhan, and pours its water into the Salkiya and Gumani. In the height of the rains, however, the waters of the Ganges roll back the waters of the Narud, and in seasons of unusual rise of water, wash away the embankments, inundating the surrounding country, on which they leave a deep alluvial deposit.

The earliest records we have shown, that Nattore has for a very long period borne a character for unhealthiness. The first English collector who resided there, writes in a letter dated 11th May 1790, that it was the most insalubrious place he had ever lived in during a long residence in India. In April 1818, C. Davis, Esq., the Judge and Magistrate of the district, writes that cholera morbus was committing dreadful ravages in the station.

About forty years ago, principally on account of the unhealthiness of Nattore, the chief government officers were removed to Beauleah, which from that time became the sudder station.

History of the Outbreak.—On the 16th October 1868, cholera broke out at Nattore, where it continued prevalent till the 10th December, when it abated, having caused the death of six hundred and thirteen of the inhabitants.

It first appeared in Kandibbetwa, in the south-east part of the town beside *the cutcheries* and close to the Bhodra Bheel.

The first victim was an old Mahomedan woman, who lived near a thick bamboo jungle, (used by some of the villagers as a burying place) and some stagnant water which had lodged in excavations made by the Public Works Department, in the construction of the Dadapore road. In this same village, up to the 10th December forty-one cases occurred, of which thirty-eight proved fatal.

On the 17th October, the disease appeared in the village Kaigori Kaishtopore, six miles south of Nattore, situated on the extreme north-west corner of the Bhodra Bheel. Here, up to the same date sixteen cases occurred, of which thirteen proved fatal.

The disease, again approaching the town appeared on the 19th October, in the village of Tahoria, on its south-west boundary, where seventy-nine died out of the hundred and eight attacked.

On the 25th the disease, taking a northerly course, spread to Borgacha, Alipore and Choudri Borgacha, in each of which it proved very fatal, 128 dying out of a total of 175.

On the 1st November, a few cases occurred in Badachitwa, a village close to the Bhodra Bheel. Here ten out of eleven cases proved fatal.

On the 2nd November, the epidemic appeared simultaneously in the villages of Mallaghati, Kannikalli, Gunnarigauon and Begpada Ambati. Of one hundred and fifty-four attacked only thirty-two survived.

On the 3rd the villages of Bauhelgharia, Chakrampore, Hurrishpore Kamodia and Putnapada were attacked, and of eighty-six cases, seventy-two were fatal.

On the 4th, it appeared in the village of Jungli near the Bhodra Bheel; eleven persons were attacked, eight died.

On the 5th at Mirpada, twenty-nine persons died of forty-one attacked.

On the 9th it appeared at the villages of Hogolboria, Kassimpore, Amigacha and Hazara Nattore, and carried off fifty-two out of sixty-nine persons attacked.

On the 11th Raipada, Amhati, Rajahpore and Bolaripoda were affected; out of seventeen attacked, thirteen died.

Tikiapoda was visited on the 14th November, when two, of the three persons attacked, died.

On the 15th Chankipahar, beside which is the Nattore Rajbarie, was attacked, and one, of a total of five, died.

The isolated quarter of Chauk Bidanauth was attacked on the 21st November.

The cleanest and most densely populated parts of the town, called Gunga-Nattore and Upper Bazaar, were attacked on the 22nd November. Of ten patients, eight died.

Chaukambatti, Kantalpoda and Lalbag were attacked on the 25th November; eight, out of fourteen persons attacked, succumbed.

On the 1st December, a portion of the town called Kapuria was attacked.

The disease appears now to have abated, as for sometime no new cases were reported to have occurred in an epidemic form.

Of the causes which contributed to this outbreak, I shall consider—

First, those arising from the natural situation of Nattore.

From the description I have already given of the place it will be observed that in and around the town there is, even for Lower Bengal, a somewhat unusual amount of stagnant water of a very foul nature; the effect of this on the health of the people, as may be well supposed, is extremely deleterious.

The evil effects of this must have been peculiarly felt during the outbreak, from the absence of that inundation which takes place usually during the rains, as the waters, on receding, carry off much decaying organic matter, which on this occasion must have been left festering in the town.

In and around Nattore there are large tracts of land covered with thick bamboo jungle which prevents that free access of fresh air so necessary to health.

The town is unfavorably situated as regards the soil too, it being of a porous character becoming saturated with moisture and retaining the germs of disease.

These natural evils are much aggravated by the habits of the people. Privies, from which night soil passes into the water, have been erected over some twenty-four tanks in and around the town, and over the Rajbarie moats, in its very centre. The condition of these and more especially of the moats, perhaps the most fruitful source of disease in the town, is beyond measure noisome and pestilential.

This is the water used by the inhabitants for drinking and domestic purposes of all kinds.

Filth too is poured into the river, the water of which is used with the same evil effect.

No means whatever are adopted for removing refuse of any kind from the town.

Indeed in this large town of inhabitants there is but one *mehter,* and he is a drunkard.

Another source of disease is the practice common among the Mahomedans of burying their dead within their enclosures.

The lower orders of the people are also especially liable to be attacked with cholera on account of the extremely bad quality of their food. Rotten fish is openly sold in the bazaar, and consumed in large quantities. *Choora* or parched rice, which is known to be very indigestible, is largely used as an article of diet.

Government not having yet supplied this most important Sub-division with meteorological instruments, I regret that I cannot give any detailed meteorological report for the time that cholera existed in the district.

Sanitary measures which should be adopted.—Proper measures should be taken for daily removing refuse of all kinds far from the town, and for preventing the deposit of sewerage in the tanks. The dry-earth system should be enforced, with regard to all privies; and provision should be made by the public authorities, for the requirements of the poorer inhabitants. To carry out these sanitary measures it will be necessary to import a number of *mehters* The provisions of the District Town's Act should be enforced for the purpose of having the noxious tanks, and more especially the Rajbarie moats properly cleaned and preserved from pollution, *at any cost*; for there is, in my opinion, no more fatal feature, within the boundaries of the town, than these hot-beds of disease.

Some measures should also be taken to render the river Narud less offensive. Public burying-grounds should be immediately provided for the Mahomedans. An Inspector should be appointed to see that unwholesome food of all kinds be not sold in the bazaars.

During the period I treat of, it is not to be supposed that cholera was confined to Nattore. It broke out in several other parts of the district, and in some instances these out-breaks could be clearly traced to infection brought from Nattore. At Sahibgunge silk factory, on the 1st November 1868, one of the servants arrived from Nattore, feeling very unwell; next day at noon he died of cholera. Before that, no cases of cholera had occurred in this neighbourhood. After his death the disease spread in the factory, eleven of the workers dying out of fourteen attacked, within a week. Finally the outbreak was stopped by the judicious measures adopted by the manager, Mr. Andrews. He caused all the factory workmen to remove, with their families, from the village to an open spot half a mile to the west, where tents were provided for them. He then caused their former dwellings to be burnt to the ground and new ones to be provided. This treatment appears to have been eminently successful, as, (with the exception of one case in the tents, which proved fatal,) no further instances of cholera occurred. In a similar way the conveyance of the disease was traced to a man who visited Diggapootteah from Nattore.

But few cases occurred here, a fact which may be attributed to the comparative cleanliness of the place.

Immediately on receiving the news of the outbreak I visited the infected district, and appointed three extra native compounders. At the same time I advised the Deputy Magistrate as to what sanitary measures should be adopted. On returning to Bauleah I sent the only two available Native Doctors to the assistance of the one at Nattore. These were shortly after replaced by two others, specially deputed by Government. These officers were daily distributed throughout the infected localities, to attend to the want of the sufferers. This they did to my entire satisfaction.

Except its fatality there was nothing peculiar in the nature of the epidemic."

Sanitary recommendations furnished to the Deputy Magistrate of Nattore, during the epidemic.—1. I would recommend that every house be properly fumigated with sulphureous acid fumes. This can easily be done by burning a little sulphur.

2. That the vomit and fœces of every cholera patient be immediately covered with dry earth, and then removed and buried deeply, not in the vicinity of the dwelling-houses, nor near tanks from which the inhabitants are in the habit of drinking water.

3. The bedding, and clothes worn by a deceased cholera-patient should be immediately burnt.

4. The brushwood and decaying vegetation, so plentiful in the villages, should be at once removed.

5. The inhabitants should be exhorted not to defecate, and throw all their refuse animal and vegetable matters, around their habitations.

6. The nasty, dirty, stagnant pools, reeking with decaying vegetation, should be at once filled up with earth.

7. The custom of burying their dead within the compounds of their houses, which is said to be peculiar to the Mahomedans of this district, should be immediately discontinued, and proper burying grounds be made without the town and villages, at some distance from them. The dead should be buried as soon after death as possible, and deeply in the ground.

8. The Police should be careful not to allow rotten fish to be sold in the bazaar.

9. The privies erected in the "Chowkees" and other reservoirs, the water of which is used for drinking and cooking purposes, should be at once removed, the chowkees and tanks immediately cleaned, and the inhabitants taught the dry-earth system for the disposal of their refuse matters.

(Sd.) S. C. MACKENZIE, M. D.,

Table showing the villages in the Nattore Sub-division, visited by epidemic cholera, from 16*th October to* 1*st December* 1868.

Date of appearance of the disease.	Names of villages.	Number of Sufferers.			Hindoos.			Mahomedans.		
		Alive.	Died.	Total.	Alive.	Died.	Total.	Alive.	Died.	Total.
16th October 1868...	Kandee Bhatua	3	38	41	...	3	3	3	35	38
17th Ditto „ ...	Kaigri Kistopoor	3	13	16	2	3	5	1	10	11
19th Ditto „ ...	Taharcah	29	79	108	...	2	2	29	77	106
25th Ditto „ ...	Burgacha	23	55	78	11	25	36	12	30	42
25th Ditto „ ...	Chowdry Burgacha... ...	2	7	9	...	...	...	2	7	9
25th Ditto „ ...	Oulaipur...	22	66	88	6	30	36	16	36	52
1st November „ ...	Buro Bhatora	1	10	11	...	...	...	1	10	11
2nd Ditto „ ...	Mulleehatty	17	43	60	6	7	13	11	36	47
Ditto „ ...	Kaulie Khally	8	73	81	3	15	18	5	58	63
Ditto „ ...	Gonarigram	7	2	9	3	1	4	4	1	5
Ditto „ ...	Bozpara Amhatty	...	4	4	...	4	4	...	...	...
3rd Ditto „ ...	Bunbelghoriah	7	19	26	4	8	12	3	11	14
Ditto „ ...	Chukrampore	4	6	10	...	2	2	4	4	8
Ditto „ ...	Hurrishpore	4	32	36	1	5	6	3	27	30
Ditto „ ...	Kamerdrar	3	27	30	...	...	...	3	27	30
Ditto „ ...	Pootooahpara or Ticcapara ...	3	7	10	...	3	3	4	3	7
4th Ditto „ ...	Junglee	3	8	11	3	5	8	...	3	3
5th Ditto „ ...	Meerporah	12	29	41	4	12	16	8	17	25
9th Ditto „ ...	Hugulborriah	12	33	45	3	9	12	9	24	33
Ditto „ ...	Kassimpore	4	3	7	...	...	...	4	3	7
Ditto „ ...	Amungachee	1	6	7	...	...	...	1	6	7
Ditto „ ...	Hazra Nattore	...	10	10	...	8	8	...	2	2
11th Ditto „ ...	Raipara Amhatty	2	5	7	1	1	2	1	4	5
Ditto „ ...	Bolariparah	2	7	9	...	...	...	2	7	9
14th Ditto „ ...	Tikaparah	1	2	3	...	...	...	1	2	3
15th Ditto „ ...	Chowtsurparah or Nattore proper	1	3	4	1	3	4	...	...	...
21st Ditto „ ...	Chuk Bydonath	2	4	6	...	...	...	2	4	6
22nd Ditto „ ...	Upper Bazar	1	2	3	1	2	3	...	...	...
Ditto „ ...	Gunga Nattore	2	8	10	1	5	6	1	3	4
25th Ditto „ ...	Chuck Amhatty	2	3	5	...	...	...	2	3	5
Ditto „ ...	Katal Borriah	2	2	4	2	...	2	...	2	2
1st December „ ...	Wapooreahpooty	1	4	5	1	4	5	...	...	...
25th Nov. „ ...	Halbag	2	3	5	2	3	5	...	...	...
	Total ...	186	613	799	55	160	215	131	453	584

16.—MALDAH.

The report is long, careful, and very creditable to Baboo U. C. Kostogree. It would appear that November, December and January are here the most unhealthy months, and that disease is most prevalent during the drying up of the inundations of the Ganges. The unusually scanty fall of rain recorded is peculiar, particularly when compared with the annual excess that occurred in Calcutta. Here (at Maldah) there were 44·55 inches in 1868, against 73·13 in 1866. It is noteworthy that the prevailing wind, during the rainy season, is south-easterly. The fish and vegetable markets would appear urgently to require to be looked to. The sanitary suggestions submitted are good, and should be enforced to the utmost. It is worthy of consideration whether, as suggested, drains could not be constructed, along the course of the bund, for the escape of the drainage of the station. The picture of a native well-privy given in this report may be accepted as an un-exaggerated representation of that universally common abomination. Slaughtering, in the close vicinity of the public hospital and of other important buildings, should not be permitted for a day. The disposal of offal seems to be most careless. The position of the Christian cemetery would appear to be very objectionable. From the great prevalence of venereal disease, I would strongly urge the establishment of a Lock Hospital. Cholera prevailed from October 1867 to June 1868, when the rains fell. Conditions of drought after inundation are, as usual, referred to as favoring the disease. It is also, however, believed to be imported by pilgrims. The remark regarding galvanism is interesting. Widows who take only vegetable diet and who have but one meal a day are said to be very exempt from cholera. This is greatly opposed to the theory of Dr. Tytler, in 1817, by which rice is made out to be the immediate cause of cholera, which was hence turned *Morbus Oryzeus*. Further observations regarding the prevalence of cholera amongst Hindoo widows would be of interest. The remark that cholera always remains *for three years* in a place once attacked, is, as before noted, one of considerable importance; I believe that the natural term of the disease is believed by Dr. Bryden to be three years. Fairs are believed to be a source of disease at Maldah. The suggestions regarding sites for *melas* are well worthy of consideration. Vaccination in the Maldah district seems to be at the very lowest ebb. I would beg to draw the attention of the Superintendent-General to the fact.

17.—RUNGPORE.

The report is not very lengthy, but it is good; clearly indicating the sanitary faults that exist.

I should be inclined to recommend the formation of a Municipal Committee at Rungpore, for the consideration of sanitary abuses, but the Government may have reasons for not appointing one. It is much to be regretted that there are no meteorological records from this station. Its position is very interesting, meteorologically; and further it would appear that epidemics are by no means common there. It seems highly important to determine, with exactitude, the atmospheric conditions that prevail where this is the case. Nothing could be more unsatisfactory than the report submitted regarding places of cremation and sepulture. The absence of control, also, as regards slaughtering places, urgently demands attention.

With regard to the drainage of the *jheels* in the vicinity of the station I find, from former records, that the " slope" would appear to be away from the river Ghagut and in the direction of the Kookrool Jheel, the fall being about 11 feet. The reclaiming to the greatest degree possible of the Cheeklee Bheel would be of much advantage to the station. I cannot help thinking also that much of the excess of ground moisture in the station might be carried off by shallow cuts leading away in the direction of the lowest levels. At present water lodges where it might, without much difficulty be carried off in the manner stated. About five years ago Dr. T. Anderson, Superintendent of the Botanic Gardens, recommended that the following varieties of fast growing trees should be planted between the Rungpore *jheels* and the station: Nauclea Cadamba, Dalbergia Sissoo, Stenospermum Chelonoides, Millingtonia hortensis, one or two varieties of Delenia and all the common species of Ficus such as Banyan (F. Indica), Peepul (F. Religiosa), Pakoor (F. Venosa). Dr. Anderson pointed out that if branches of the trees last named, two or three feet in length, were placed in the ground during August, they would at once take root, and, if protected by proper fences, that, in a few years, they would be trees. It was recommended that seedlings of the other trees, which could be supplied from the Botanic Gardens, Calcutta, should be planted out at the commencement of the rainy season. These recommendations were embodied in a letter No. 36, dated 2nd August 1864, to the Hon'ble Ashley Eden, Secretary to the Government of Bengal.

It appears to me that arboriculture has not been sufficiently carried out at Rungpore in the direction of the *jheels.* The above recommendations, if acted up to, would also be found productive of good at other stations.

18.—JULPIGOREE.

Dr. Kenneth McLeod, deserves much credit for having written two Sanitary Reports; one for Jessore, and the other for Julpigoree,—both of them very careful as might be expected. In consequence of his having been moved from one station to the other, Dr. McLeod, writes from a personal knowledge of both. Being a comparatively new station, it is satisfactory to know that Julpigoree is healthy. Its site has been very well selected, having a double slope of drainage. The prevailing wind, passing over the stream of the Teesta, sems to add greatly to the salubrity of the place. The endemicity of goitre, is to be remarked; it is due to the calcareous impregnation of the Teesta water. It is probable that the use of distilled water might be found beneficial. The dipterous insect alluded to by Dr. McLeod, well known in that part of the country as the *Pipsa*, is according to Hooker, a species of Siamulium; it is not met with at Rungpore. It will be a matter of interest and importance hereafter to discover why the northern parts of the Julpigoree district are comparatively exempt from cholera.

19.—DARJEELING.

The report is good so far as it goes; but it is brief and somewhat meagre. The climate is said to be less damp than formerly. The cutting down of timber in the vicinity of the station is, in my opinion, carried too far—a common mistake at Indian hill sanitaria. Dr. Simpson's report of the outbreak of typhoid remittent fever at the convent is too vague and brief to be of value. I have since visited the site and the establishment. Excrementitious impurities on an adjoining hill-slope seem to have had something to say to the appearance of the disease. The hill in question has now been thoroughly cleaned, and the internal arrangements of the school are most carefully attended to by the Lady Superior and the Nuns, whose interest in their pupils is quite parental. It is to be hoped that the conservancy of Darjeeling may ere long be improved. No system now exists. The scheme for destroying the refuse matter of the station by furnace heat, brought forward by Mr. Gilbert Hickey, is now under the consideration of the Government. The result will be dwelt on in my next report. Meanwhile I would urge the advisability of agriculturally utilizing all the waste matter of the station. All cess-pits should be abolished. In a future report I hope to dwell at greater length on the characteristics of the climate of Darjeeling, as compared with other hill stations.

20.—PURNEAH.

The report is short and unsatisfactory. The deficient rain-fall is well worthy of note when compared with what occurred in Calcutta.

21.—BURDWAN.

The report is a very good one.

It is satisfactory to know that the town is cleaner than formerly. The Magistrate would do well to incite the Native Municipal Commissioners to take more interest in their duty to the public. I would draw attention to Dr. Mantell's objection to the proposed *anicut* across the Banka river. The unusually heavy rain-fall during the past year presents a curious contrast to what occurred at Tirhoot, Purneah and other places noted elsewhere. It is to be hoped that the barometer and thermometers sanctioned, will ere long be supplied. The proposed public latrine, centrically situated, ought certainly to be constructed. I think Dr. Mantell's suggestion regarding an Inspector of nuisances is a very proper and reasonable one. It would be well if the Municipality would agriculturally utilize the night soil of the station. The systematic deposit of filth on the banks of the river should be put a stop to. The filling in of excavations with sweepings and the dung of animals is objectionable. The slaughtering-places should be removed well away from habitations. The soakage of blood into the ground might easily be prevented. Dr. Mantell writes that ten grain doses of white arsenic are administered in cases of cholera, and that for eight days neither food nor water is allowed to fever patients. Surely there must be some mistake here. The subject of the administration of cobra poison merits further enquiry. Its exhibition to fever patients is very common.

Dr. Mantell's notes on the malarious fever of the district are extremely interesting. It is to be observed that he insists on the non-contagiousness of the disease. The condition of Selimabad furnishes a very sad story; out of 1,300 persons not one escaped attack! The extension of vaccination by the collateral effect of mock *poojahs* is worth remarking. From Dr. Mantell's letters on the subject, addressed to the Inspector-General of Jails, Lower Provinces, I find that cholera appeared at Burdwan on the 11th April, in the person of Omesh Baboo, a resident of Calcutta, who had arrived that day and who died on the 14th instant. In the immediate vicinity of the jail, five cases of cholera occurred in the general population; of these, four proved fatal. In the jail itself nine cases were reported. None were fatal. The first case occurred on the 14th April; the last on the 17th idem; after that, there were no more cases, amongst the prisoners, One Police Constable died on 28th April.

Dr. Mantell believes that the disease was brought by the man from Calcutta, and that it was communicated to the prisoners "through the medium of discharges contaminating surrounding atmosphere," near the jail.

These is not much said as to the water-supply of the jail at the date of the outbreak. "Between the 8th and 25th of April, only nine-tenths of an inch of rain fell, and the wind during the outbreak was generally from the east. The heat of the weather at the time was excessive."

22.—CUTWA.

The report of the Sub-Assistant Surgeon is a creditable one. The silting of the Hooghly as a cause of disease is noticed. The spread of venereal disease at fairs deserves more attention that it has as yet generally attracted. Baboo Chunder Nauth Biswas, deserves great credit for his successful efforts in the cause of vaccination at one of the head quarters of superstition. The Baboo's opinion regarding *kobirajes* is a fair and true one.

23.—BANCOORAH.

The report is a good one.

It is satisfactory to know that the health of the district generally (two or three places excepted) is improving. The climate is particularly dry for Bengal, and the drainage of the station is tolerably good. The history of cholera under such circumstances in past years would be instructive. I quite concur with Dr. Richards in the opinion that a copy of all Mortuary Registers should be submitted to the Civil Surgeon ; the subject particularly falls within the scope of his duty. Sonamookhey, Bishenpore, and Patrashuhur ought to be carefully and continually looked to, until average rates of sickness and mortality obtain. A Barometer should be supplied for the station records. Orders should be passed regarding the refuse of the slaughter-yard. It is worthy of remark that inoculators now come to Dr. Richards for supplies of vaccine lymph. Inoculation is not much practised; under such circumstances one vaccinator for a district must be very insufficient. The fatal practices of the *kobirajes* and *boidos,* as set forth by Dr. Richards, point to the advisability of some supervision being introduced over this class of men.

24.—RANEEGUNGE.

The report by Dr. E. J. Roberts, is careful and to the point. It will be observed that pilgrims, and also coolies, recruited in Chota-Nagpore, are believed to import disease annually. It is to be desired that the reported exceptional prevalence of elephantiasis at the village of Acheepore should be further enquired into. The record of cholera at Raneegunge during the past year, is very interesting. It will be remarked that Dr. Roberts attributes the prevalence of the disease chiefly to the impure water-supply of the "Raibund," and in a minor degree to the contamination of all tanks. The fact of there having been no case of cholera in the jail is very note-worthy. It is much to be regretted that the people cannot be induced more generally to make use of good well water. It is but right to notice that Mr. J. A. Hopkins, Assistant Magistrate of Raneegunge, is of opinion that Dr. Roberts too severely condemns the Raiband tank. He believes the spread of cholera to be dependent on other causes, which are set forth in his letter, No. 128, dated 22nd July 1868, to the Magistrate of Bancoorah. As the subject is one of much permanent interest, I think it well here to adduce Mr. Hopkins' views in original. With considerable confidence he writes as follows :—

2. "Cholera has been flying about my Sub-division the whole of the past year. In my cold weather tour I came across cases amongst the collieries west of Raneegunge. No serious outbreak occurred. Dr. Roberts merely speaks of it since March, when cases became more frequent and the people became frightened. I am of opinion that travellers do not import the disease, but take that already in the country, being susceptible in consequence of exposure and privations to which they are not accustomed.

3. I can account for cholera in the wild districts south of the Damoodah and the collieries, but I cannot account for it in Raneegunge. South of the Damoodah the water supply is bad, being the drainage of the neighbourhood only, and necessarily containing a large quantity of unwholesome animal and vegetable matter ; as the reservoirs dry up, the water becomes less and less pure, and thick with dirt, and it is from drinking it that the germs of the epidemic are sown. In the collieries large gangs of Sonthals, Bowrees, Bagdees, and Bhooyas are employed. The water in the neighbourhood is usually good, but the flesh used by the miners is generally tainted and impure : the consumption of it is no doubt productive of disease of all sorts. On the other hand, Raneegunge is a clean town, the streets are wide and well drained, and the water supply is good. The great Raiband tank does not drain the tract supposed by the Civil Medical Officer : the drainage of the tract referred to by him passes along the Bancoorah road into the fields and the Damoodah. I have visited the whole of the part of the country, and have found that the water of the Raiband comes from Searsole and the land north-west of the Raneegunge bazaar, and that between it and the bazaar there is a another line of drainage going out into the fields, bordering the Bancoorah road.

4. There are two large public wells in the centre of Raneegunge; they are largely used by the people. The recommendations of the Civil Medical Officer have been carried out; but I do not agree with him in entirely attributing the disease to the Raibund, for the class with whom cholera has been most severe are travellers, who certainly have not consumed the water of that tank, it being too far from the town to be used by strangers. As a rule, they would scarcely be able to find it, hidden as it is from sight by the Railway embankments.

5. I am more inclined to attribute the cholera of Raneegunge to the state of the *chuttees* and *serais* along the Grand Trunk Road; to the exposure and privations to which travellers are subjected, and to bad meat used by the low caste people of the neighbourhood."

Whatever may be the influence of tainted meat, and of over-crowding in the *chuttees* and *serais*, it is evident that Mr. Hopkins has done well in having the recommendations of the Civil Surgeon carefully carried out. The very fact of cholera existing in any locality affords, in these days, reasonable grounds for suspicion as to the purity of the general water-supply. In writing this I would not have it understood that I, in the very slightest degree, depreciate Mr. Hopkins' anxiety regarding the very faulty conditions ever present in pilgrim lodging-houses, and the like. It is curious to remark that whilst the rain-fall at Raneegunge in 1868 was less than in 1867 (as was also the case at Poorоolia) the reverse held good at Bancoorah, Burdwan and Calcutta, as the following figures show:

	1867	1868.
Raneegunge	... 63·78	... 59·39
Pooroolia ...	... 49·50	... 43·20
Bancoorah ...	... 48·02	... 61·25
Burdwan ...	... 54·90	... 75·77
Calcutta ...	... 76·72	... 91·49

25.—BEERBHOOM (SOORY.)

The report, by Dr. Sheridan, is one of the best that I have received; it is careful throughout, and gives a fair idea of the usual impurities discoverable in the neglected places of Bengal. Dr. Sheridan considers that the introduction of the Municipal Act, in a modified form, would best meet the sanitary requirements of Soory. I hope this suggestion will meet with the consideration of the Government. The proposal that zemindars should be held responsible for the general cleanliness of their villages seems reasonable enough. As usual the drying up of tanks, rice-fields, and the like is noticed as a cause of disease. Epidemic ophthalmia prevailed in August and September; and rubeola from February to May. Dr. Sheridan's sanitary suggestions are well judged, and they ought, as far as possible, to be carried into effect. The government distillery is complained of as a nuisance. The slaughter-house which is close to human habitations should be removed; the offal should certainly not be taken to the banks of a tank. Only one case of cholera is reported in Soory itself. Deflection of pilgrims has been found to be of use. I would draw attention to the fact of vaccination being reported as at a stand-still.

26.—RAJMEHAL.

The report, by Baboo Benny Madhub Bose, is on the whole good. The sanitary condition of the district is said to be deteriorating. This is scarcely to be wondered at, if what the Baboo reports is correct, *viz.*, that there is not a single deep and clean tank in the whole of the district. The influence of silting, and of the formation of *churs* is, as usual, remarked on, as being very deleterious. The question mooted as to the possibility of connecting the *nullah*, to the north and east of the town, with the river, might be referred to an Engineer officer. Cholera appeared in the middle of April and seems to have prevailed epidemically for about two months. It is to be noted that the heads of villages, of their own accord, apply for vaccination, the facilities for which do not seem, according to the report, to be sufficient.

27.—DEOGHUR (SONTHAL PERGUNNAHS.)

The report, by Dr. R. C. Chundra is a good and careful one. It is well to know that improvements have occurred in the station within the last two years. It is to be hoped that still greater reforms may ere long be carried out in the native town, which seems to be in a terrible state of insanitation. Amongst other points, it is noted that the contents of privies pass into the open surface drains; there is no organized conservancy; bodies are burnt on the banks of sacred tanks; the sources of water-supply are greatly contaminated; and here, at the shrine of Mahadeo, people congregate from all parts of India, sometimes numbering 100,000, or even more. Such are the localities, of all others, where stringent sanitary regulations are imperatively called for.

28.—POOROOLIA (MAUNBHOOM.)

The report, by Dr. William Wilson, is a long and careful one. It is particularly to be remarked that cholera is here reported as having broken out when unusually heavy rain fell (in June.) This by no means corresponds with what usually happens in Eastern Bengal, and elsewhere. The disease appeared at Pooroolia on the 10th of June. From that date until the 11th of July, eighty persons were admitted into the Charitable Dispensary (of these forty-two were male-adults, twenty-six female-adults and twelve children), forty deaths occurred, and the same number of recoveries. Dr. Wilson, writing on the 19th July, remarked : " The rain has ceased ; total fall 16 inches and 3-10 of an inch, and the cholera is abating." It is to be regretted that any reduction should have recently been made in the strength of the conservancy establishment. The proposal for six carts, with proper supervision, seems to be very reasonable. Indiscriminate cutting down of forest trees is most unjustifiable. Those who do it cannot know to what a degree such a proceeding affects the climate of any locality. In America France, Italy, Greece, Palestine, and indeed in every country, where malarious disease occurs, severe epidemics have been known to follow the extirpation of forests. Here, in the case of Pooroolia, we are told that forests have been indiscriminately and imprudently cut down ; the rain fall has diminished, and epidemic disease has greatly prevailed. It is to be hoped that the planting of new trees will be greatly encouraged ; the effect of which is to induce and to equalize rain-fall, and also to equalize temperature. This point is, I am aware, one on which the Government has often passed strict orders. Under such circumstances, it is only the more provoking that the ignorance of individuals should cause misery to the masses. " Destruction," says a great writer on the subject of malaria, (Macculloch) " was first let in upon the Campagna of Rome by the removal of the forest reaching from the heights of Frascati and Albano to the Tiber." An example so classical should not escape the recollection of educated men.

It is to be observed that the smaller lanes of villages in the Maunbhoom District are described as being " during the rainy season, knee-deep in liquid manure and filth, and during the hot weather overpowering from effluvia given out." As usual defecation is commonly practised close to tanks and pools— " the nearer the better " the people think. Some special locality should be fixed for cremation. The arrangements around slaughtering-places appear to be very faulty. The offensive pond, close to the new police thannah, should be filled up. The Civil Surgeon appears to have done all that lay in his power during the prevalence of cholera. I would draw attention to the fact that there was no systematic vaccination in the district during 1868. The personal efforts of the Civil Surgeon and of the Deputy Commissioner, in persuading "Thebaits" to be present at the vaccination of the children of persons of high caste are of considerable interest, and creditable to those officers.

29.—CHYEBASSA.

The report is a good and careful one. It is to be observed that Chyebassa, in a sanitary point of view, is said to be "all that could be. wished;" yet we are also told that bathing is allowed in all the tanks. The rain-fall in June was very high, 24·68 inches. It is curious to compare this with what occurred at other stations during the same month. At Midnapore during June 22·75 inches fell; at Bancoorah 15·25; at Burdwan 12·9; at Raneegunge 20·89; at Beerbhoom only 8·85; at Hazareebaugh 15·02; at Pooree 11 inches. According to the meteorological recorder's statistics, at Balasore, in June there was a rain-fall of 36·20. The variations (even although all the records may not have been kept with equal care and accuracy) are interesting. The fact is a curious one that, from fear of infection, the Coles do not burn but bury those who die either of cholera or small-pox. The extreme prevalence of venereal disease seems to call for special preventive arrangements. The fact that inoculators consent to vaccinate proves that the English prophylactic might be extended with less difficulty than usual. The absence of prejudice ought to be made the most of.

30.—HAZAREEBAUGH.

The report is a good one and has been carefully drawn up by Dr. Delpratt. Great credit seems to be due to the Deputy Commissioner for the general sanitary improvements that have occurred at this place. Although the report is not an explicit one, the mere rumour that three children out of five die is a very serious matter and merits further enquiry. The localized outbreak of cholera at Echak is of considerable scientific interest. The disease appeared on the 17th of June; on that day one death occurred; on the 18th one death; on the 19th five; on the 20th three; on the 21st three; on the 22nd one. Echak is eight miles north-east from Hazareebaugh. The District Superintendent of Police, in his Memo. No. 728, dated 10th August 1868, writes as follows: "The person first attacked in Echak was a resident of that place; the cholera did not spread beyond Echak. Two residents of Echak came to Hazareebaugh and were attacked by cholera; one died, the other recovered." Major Boddam, the Deputy Commissioner, visited the place and wrote as follows, (vide his letter No. 498 of 23rd June 1868):

4. "Cholera appears to have been brought into the town, by the return of a large marriage party which had gone to Khurruckdieha, and also by the arrival of another large marriage party from Bogodhur, both of which parties had lost one or two of their members from cholera on the road to Echak.

5. Cholera made its appearance in the houses of the persons to whom these "Borats" came, the very day of their arrival; and though there have been a few sporadic cases here and there in the town, the disease seems to have confined itself principally to these houses and their immediate vicinity.

6. In one house there had been six cases, four fatal; in the neighbouring house, there had been three cases, one fatal; and in one house, a very short distance off, there had been three cases, but all were in a fair way of recovery.

7. In all these houses sanitary arrangements were wanting; the drinking water came from a well close to which there was a filthy drain, and the family latrine—the water in the well being close up to the surface and evidently partly supplied from the surface drainage."

Dr. Delpratt also reported that "several of the tanks are literally surrounded by cess-pits." This was more especially noticed on the premises of two individuals, where the disease at once showed itself; four out of five patients died. "No cases were reported from any other part of the district." The town of Echak ought to be thoroughly overhauled and subjected to strict sanitary surveillance.

The question of the drainage of the marsh which lies to windward of the station appears to be an important one, and I would suggest that an Engineer officer's opinion should be taken on the subject, if such has not already been received. The marsh should, if possible, be drained.

Cholera prevailed in the Sub-division of Palamow from 23rd June till 11th September during which time 717 deaths were reported. It abated when the regular rainy season set in, but a fresh outbreak was reported on the 31st August.

31.—BHAUGULPORE.

The report by Dr. Wright has been carefully drawn up. It is much to be regretted that native gentlemen at Bhaugulpore do not take a proper interest in their municipal obligations. The influence of personal energy is particularly necessary in sanitary matters. The government distillery, being a nuisance, should be regulated, or removed to a proper distance. More meteorological apparatus, such as a barometer, a dry and wet bulb thermometer, &c., should be provided for the station. The continuance of interment near the habitations of the living ought to be put a stop to; public funds ought to be found for such a purpose. The slaughter-houses near dwellings should be removed. The hide-scraping, the tan-yard and other nuisances mentioned by Dr. Wright, should all be checked. The suggestion to distribute cholera medicines to the *munduls* of villages appears to me a good one and worthy of mention. Dr. Wright states that he has never been able to trace any special connection between meteorological phenomena and the occurrence of disease, and he entirely mistrusts the statements which go to prove the existence of such a connection. This is a very important consideration, upon it hinges, as many believe, the presence and prevalence of disease, and the varying rates of mortality. There can be no doubt that many conditions, other than those which are of a truly meteorological character intensify the force of disease; yet to ignore the influence of meteorological states, as bearing closely on pathological lesions, is to deny the influence of climate altogether, and to shut our eyes to much that is of prime importance, in the causation and propagation of disease. This is not the place to discuss such a question fully; a few facts may, however, be alluded to with advantage, as opposed to the opinion expressed by Dr. Wright, which were it to be generally acted up to, would greatly impede the rational study of those chemico-physical influences which coincide with the greater or less prevalence of cholera, small-pox, fever and other diseases. It has been shown, on an average of twelve years, that the scale of sickness amongst European troops stationed at Fort William is in an inverse ratio to the conducting power and pressure of the atmosphere (McClelland, p. 37). Again, bills of mortality steadily show higher ratios from particular diseases at particular seasons than at others (*Op. cit.* p. 39) and lower ratios (in many instances) according to elevation. Thus "in the West Indies, it is observed that an elevation of 2,500 feet has been found sufficient to remove the European from the range of yellow fever. In consequence of this change, the mortality of our troops in Jamaica is now found to be little if at all in excess of those serving in the United Kingdom." (*Op. cit.* p. 139).* "Yellow fever," writes a careful author on the subject "is peculiar to those countries which have a high temperature, where there are, successively, great drought, heavy rains, and speedy evaporation, producing a low electric tension." (*Craig on the influence of variations of Electric Tension, as the remote cause of epidemic and other diseases.*) The conclusion arrived at by the Commissioners appointed to inquire into the sanitary state of the Army in India was, "that diseases of the epidemic class prevail most severely and extremely in localities where, and at seasons when the elements of heat and moisture most predominate." We find in Dr. Parke's standard work the following: "Malarious diseases, it is said, never attain their fullest epidemic spread unless the humidity approaches saturation." (p. 435). The curative effect of low atmospheric pressure is to be observed in every Indian hill station; and as regards the important question of temperature as affecting the diseased, we know the exact height we must ascend for every degree of temperature, we lose. Professor Casper of Berlin, after a study of seven years of meteorological record, arrived at the conclusion that "in nearly all the seasons of the year a high atmospheric pressure increases, and a low pressure diminishes the rate of mortality" (*vide*, Sir Ranald Martin "on the influence of tropical climates" p. 89). Again the mortality of epidemic disease in London was found by Mr. Glaisher to be in an inverse ratio to the amount of positive electricity in the atmosphere. But it is by no means necessary to go out of India to prove the coincidence of certain definite meteorological states with an increment of specific disease. I would only refer to the statement given at p. 15 of the second Annual Sanitary Report for Bengal, showing the prevalence and fatality of small-pox on the European Army of the Bengal Presidency from 1858 to 1863. During those five years there was not a single admission in the months of September and October and only one in August; in March there were 120; in April 293; in May 141. In May 36·88 per cent of treated died; in August, September and October there were no deaths. Again, (*vide* the same Report p. 56) there was not a single case of small-pox in the whole regular native army from May to December 1865. Dr. Hugh Macpherson, arguing from the statistics of twenty years in Calcutta, found that the deaths from small-pox in twenty months of March numbered 3,918, whilst in twenty Septembers they were only seventy-two, the mortality of the one month being more than fifty times that of the other. (On the mortality of Calcutta, p. 15). In the case of cholera during five years, the deaths in five Mays amounted to 127, or 39·4 per cent of the deaths from all causes; while in five Septembers they were only twenty-seven or little more than one-fifth of the former (*Op. cit.* p. 38). With reference to the total mortality of the twenty years, excluding epidemics, the deaths in the cold season amounted to 40 per cent of the whole, in the hot season they were 34½ per cent, and in the rainy season only 25½.

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* NOTE.—Since Dr. McClelland wrote the above statement, yellow fever occurred at Newcastle, Jamaica (4,000 feet above the sea) in 1860 (vide Parke's Hygiene, 2nd Edition p. 447) so that the limitation formerly laid down is not absolute or universal, yet the spirit and truth of the argument remain unaffected.—D. B. S.

Those who would see the periodical increase of cholera according to the meteorology of seasons have only to consult Dr. John Macpherson's work, "Cholera in its Home."

From the above, we see that Dr. Wright's opinion as to the non-connection between particular diseases and the existence of special meteorological states is somewhat opposed to that of the highest authorities, and indeed that it is an opinion which is strongly disproved by a study of recorded facts. The results of Dr. Wright's experiences in times of epidemic cholera are highly unsatisfactory. He has "no theory and no faith in any treatment." In other words he can detect none of the laws of disease, and acts with vague uncertainty. A more profound and eager study of the subject is clearly the only means of advancement under such circumstances. I believe a close scrutiny into the meteorological conditions which prevail, by fixed law, during epidemics of cholera, small-pox and other diseases will bring us to conclusions directly opposite to those arrived at by Dr. Wright. Our absolute or relative ignorance is the real secret of every paradox in science. Dr. Wright's arguments regarding vaccination and inoculation appear to me very faulty, but it is unnecessary to discuss them here. His suggestion regarding native drugs is a good one. Many indigenous remedies would be of much greater value were they carefully collected and supplied by proper judges, specially appointed for the purpose.

32.—MONGHYR.

The report by Dr. J. Macleod Cameron, is a very careful and creditable one. The tables on meteorology and vital statistics and the notes on season and climate are good. It is satisfactory to know that the year under review was one of the healthiest on record, and that no exceptional sickness or mortality occurred. I quite agree with Dr. Cameron, in the opinion, that all mortuary returns should be submitted to the Civil Surgeon, for his information and guidance. I have already elsewhere recommended that this should be carried out. The drains of Monghyr evidently stand much in need of improvement. From their defective levels they are frequently simple cess-pools. It is much to be regretted that "none of the municipal bye-laws are enforced." Dr. Cameron's suggestions for local improvements are judicious, and they should be carried into effect. I would draw attention to the graphic and true picture of one of the big hollows so frequently met with not only at Monghyr, but in every Bengal locality. The pollution of the river water, during the cold months, ought to be carefully looked to and prevented. It is to be hoped that the washermen have been removed. The contamination round a particular well has been most truly described by Dr. Cameron, and it affords a fair picture of a most terrible condition of things to be met with in many parts of every town in Bengal. Until such abominations are vigorously attacked by the local authorities, no real sanitary reform can occur. The sight of stagnating sewage ought at once to arouse the municipal authorities to vigorous action. As it is, we learn that municipal refuse at Monghyr is thrown into hollows and into the fort ditch! The slaughter-houses ought to be constructed as proposed. The fact reported is a curious one, that cholera prevails in the jail and in the town at different times. It is to be observed, that fairs are never known to cause outbreaks of disease. Much credit seems to be due to the Sub-Deputy Opium Agent for the improved arrangements in connection with the periodical weighments of opium. The fact is a significant one, that seventeen native inoculators are now employed making use of vaccine lymph in the district. Dr. Cameron's remarks as to cholera spreading without individual contact, and the deduction drawn therefrom, are worthy of careful consideration.

33.—GYA.

The report, by Dr. Russell, is a particularly careful and creditable one. It is drawn up with great precision and neatness. If every Civil Surgeon had taken as much care in this respect as Dr. Russell, I should have been saved a great deal of trouble. Many of the reports are hastily written and illegible. Moreover in many instances the request made that they should be written only on one side of the paper has been ignored. Dr. Russell's report is clear and careful throughout.

The causation of the "Gya sore" is a subject worthy of further enquiry and report. The total rain-fall in 1868 was 27·41, the average being from 32 to 35 inches. In 1867 it was 61·08. This deficiency during the past year is very interesting, as contrasting with the fact of an increased rain-fall in Calcutta, during the same period, (where it was 91·49; being 76·72 in 1867; 65 74 in 1866; 61·58 in 1865; and 52·08 in 1853.)

The slaughter-houses which are said to be close to dwellings ought to be removed. The burning of bones ought also to be prevented, except at a considerable distance. Dr. Russell believes that death has never been caused immediately by the fumes emitted from a brick-kiln; but it is to be observed that Dr. Durrant, has recorded a case in point, to which I have already alluded in my remarks on the sanitary report from Noakolly. Dr. Russell's remarks on epilepsy merging into apoplexy are of considerable clinical interest. The fact that cholera raged epidemically during the months of June and July is one of considerable interest, as being an exception to the general rule. By a reference to the meteorological return it will be seen that the greatest rain-fall occurred during the months named (6·62 inches in June, and 7·57 in July).

Dr. Russell's remarks on cholera, in connection with pilgrimage, are particularly interesting more especially the observation that "*cholera prevails* *most, precisely in those months in which the place is least visited by pilgrims."* This clearly shows that the disease is dependent on influences of a general character, and not merely on the very favourite, but too rigid and insufficient formula,—*" contactu ægrorum."* Dr. Russell, who from his position we may suppose to have much more direct experience of this very important subject than most men, does not consider pilgrimage to be an immediate cause of cholera.

The strange fact of a people positively hailing the appearance of small-pox is here before us. It is to be expected, however, that superstition will longest retain its influence around such strongholds of Brahminism as the sacred shrine of Vishnupod, It would undoubtedly do the cause of sanitation vastly more harm than good to attempt injudiciously to force its claims on the people against their cherished religious convictions.

34.—PATNA.

The report, from Dr. R. Hutchinson, is a good one. We are told that there is one conservancy sweeper to 8,750 souls, and that there is one Municipal latrine in the city! The pigs are said to attend to the conservancy!! Dr. Hutchinson's notes on narcotics are of some interest, although they do not perhaps convey much original information. It is worthy of note that 75 per cent of Mania cases are said to depend upon excess in the use of *gunjah* or *bhang.* The absence of epidemics is also to be remarked. The allusion to the establishment of model villages is of decided importance. I have already myself addressed the Government on this subject. Well constructed model villages would create a new phase of rural civilization in India. The government distillery, complained of by Dr. Hutchinson, ought certainly to be removed—the more does this appear to be necessary as its foul refuse is said to have contaminated the water of the principal *pucca* well of the *mohulla.*

At the end of May the District Superintendent of Police, reported that 615 deaths from cholera had occurred in the city of Patna, from the beginning of the year—a mortality of about 3 *per cent* in five months.

35.—MOZUFFERPORE—TIRHOOT.

The report, by Dr. Gayer, is somewhat short, but good. The Civil Surgeon ought to see all the vital statistics which are collated in the district. The question of special office establishment has already been submitted to Government. Dr. Gayer would have done well to state in what localities the drainage of the country is interfered with by roads. The Mozufferpore lake ought to be improved under the orders of an Engineer Officer. It is to be regretted that no meteorological observations are conducted at Mozufferpore. Instruments should be supplied and records kept for the future. The want of rain in Tirhoot, during 1868 is worthy of remark. The report of the sanitary condition of Mozufferpore, points to a highly unsatisfactory condition of things. Indeed it is said to be " as bad as possible," suggested improvements have not been carried out, no real interest is taken in the subject; drainage is obstructed; burials occur in the heart of the town; cremation is not carefully conducted; dead bodies are thrown into the river; there are no slaughter-houses ; trees have been imprudently cut down ; there is great local uncleanliness; and yet Dr. Gayer's suggestions appear to be both reasonable and feasible.

36.—CHUMPARUN—MOTEEHAREE.

The report, by Dr. Clement Sconce is very creditable to him. It affords a good general outline of the sanitary condition of the district. It is to be regretted that no meteorological records are kept at Moteeharee. Dr. Sconce, caused no less than 145 wells to be measured. They varied from 8 to 25 feet from the ground level, the depth of water being from 1 to 7 feet. It is to be hoped that the new cemetery at Bettiah, made over to the Roman Catholic community, will be used in future, instead of the burial ground in the heart of the town. The cremation of Hindoos at Bettiah would seem to be very carelessly effected. The drainage of the place ought also to engage the attention of the Officials. Adulteration of comparatively harmless spirit with *dhatoora* should be put a stop to; not only at Chumparun, but in all other places where it is practised. The single sporadic case of cholera in the jail, referred to by Dr. Sconce, is of much interest. It is greatly to be regretted that the exciting cause of the disease cannot be traced in such cases, which, for purposes of enquiry, are of a less complicated nature than all others. This case was not traceable to outside communication. Was this proved to be impossible, through such *media* as Police guards, paid warders, the native doctor and compounder, and the *hajut* prisoners ? If it be allowed that fresh cases can thus spring up anew, quarantine cannot possibly be a reliable safeguard. Dr. Sconce's remarks on the difficulties usually encountered during periods of epidemic sickness are worthy of note. His observations on goitre, so far as they go, are also of considerable interest. They very properly point to lime impregnation as the cause of the disease.

It is evident that a single vaccinator must be insufficient for a whole district where small-pox not unfrequently prevails. Dr. Sconce's remarks on quarantine are very judicious. The condition of the poorer classes at Bettiah as pictured in this report, would seem to be very terrible. It is to be hoped that something may be done for their amelioration. Dr. Sconce has forwarded numerous Appendices with his careful Report, which from their length, must be omitted. The following facts are taken from them.

The average daily strength of prisoners in the Chumparun jail during 1868 was 266. The total number of sick during the year was also 266, of whom 14 died.

The strength of the Police at Chumparun was 439; the total No. of sick 202, with 5 deaths.

The total number of vaccinations was 607; of these 181 were Christians; 232 Hindoos; and 194 Mahomedans. Of the total 607 cases, 380 were successful, 189 unsuccessful, and 38 doubtful.

In thirty tuppehs of the district, the total number of inhabited houses is 1,46,957; the total population 5,22,788.

The condition of Ramnuggur, judging from Dr. Sconce's letter No. 103, dated 22nd February 1869, to the Magistrate of Chumparun, would seem to be very unsatisfactory, it being an excessively filthy and uncared-for place.

"The people are thoroughly under the dominion of the Brahmins, in whose ceremonial injunctions they repose entire confidence." Dr .Sconce reports that the residence of the Rajah was no exception to the general rule of dirt. He tried to get the Rajah to show an example to the people; but, he writes, "the triple brass of superstition, prejudice and ignorance which envelopes the chief of this people proved too strong for me, and my efforts in this direction were totally unavailing. When in conversation with the Mooktear or Mohurrir who visited me on the Rajah's behalf, I recommended a warm bath for his master; I was told that bathing was prohibited by the *shastras* under the Rajah's circumstances, till the expiration of a certain period, not yet completed. When I suggested iron, quinine, and nourishing food, I was told that a *kobiraj* had already prescribed for the Rajah. The suggestion that carriage exercise and change of air would be beneficial, was met by the objection that the spiritual advisers of the Rajah had forbidden him to leave the house; even the recommendation that he should wear flannel clothing was considered as rather an objectionable innovation on antecedent custom."

In the face of such difficulties, prejudices, and frivolous excuses, Dr. Sconce not unreasonably arrives at the following conclusion: "The most sceptical may at times be convinced by enquiry, but proof is impossible where an ignorant crowd, not content with denial, refuses all opportunity for experiment." It is to be observed that three weeks later, Dr. Sconce found that some clearance of the place had been effected, and the Rajah promised " to transfer the town bodily to another situation." Time will show if this good resolve is carried into effect.

The question of changing the site of the sudder station to Sugaon has been entered into by Dr. Sconce in his letter No. 109 B. of 26th March 1869, to the Magistrate of Chumparun. The following is the conclusion at which he arrives:

"My own experience of Moteeharee is altogether favorable. On a reference to Dr. Mouat's exhaustive and scientific report of jail statistics for the year 1867, I find at page 60, para. 44, the following remark: 'With regard to average sickness rate the highest was ·09 to mean population in the Kamroop and Cachar Jails, and the lowest ·0008 in the Chumparun Jail. In all the other jails the rates oscillated between ·01 and ·08 to mean population.' From this it would appear that the Moteeharee Jail occupies the exceptionally favorable position of being the healthiest in the Bengal Presidency. Bearing in mind this fact, I would venture to ask suggestively, would it be prudent to abandon a position known to possess such sanitary advantages for a new site."

37.—MIDNAPORE.

The report, by Dr. Bedford Allen, is careful and good. It is to be remarked that the station is reported to be " undoubtedly very healthy;" and yet it stands on a laterite soil. Fevers prevailed most in October and November. These facts do not coincide with certain published opinions regarding the influence of laterite. Dr. Bedford Allen's meteorological records are careful. The suggestion to sub-divide the town into separate blocks for the purpose of facilitating sanitary survey and control, is much to be commended. The plan should be everywhere followed. The refuse sweepings of the town ought not to be thrown into the *khâls*. The hide manufactory complained of should be removed. The mortality from cholera seems to have been very fearful, 79·32 *per cent* of those attacked. Many of the sufferers were probably enfeebled pilgrims. Dr. Allen states that cholera was brought into the station by pilgrims on their return from Juggernauth. From my own enquiries made at Midnapore, I was inclined to think that the pilgrims on their way to Pooree encountered the disease in the Midnapore District, and that it could not be proved that it had been imported from a place of pilgrimage. The cessation of the epidemic after heavy rain and electrical disturbance is to be noted.

The absence of cholera from the jail is also note-worthy, as is the prevalence of dysentery amongst pilgrims. The cases of "fever" reported by the Sub-Assistant Surgeon were evidently not instances of specific "relapsing fever." The relapses occured at intervals of a fortnight and the disease was not contagious. These are clearly not the characteristics of the recurrent fever of Murchison.

The independent spread of cholera at Morgua Chowra is to be noted. The fact of vaccination being much appreciated is worthy of remark. It is in such localities that the prophylactic should be extended to the utmost, particularly as Midnapore is on a route which is annually frequented by throngs of pilgrims arriving from all parts of the country.

38.—BALASORE.

The report, by Dr. J. Davies, is a good one and very suggestive. It is satisfactory to know that the place has considerably improved during the last twenty years, and that it is now very healthy. The excessive generation of malaria at Dhamra affords a very good instance of the pernicious effects of marine inundation. Dr. Davies' remarks on elephantiasis are interesting, and it is to be hoped that he will carefully extend his observations on this subject. The remarks submitted regarding the connection or coincidence of cholera and conditions of drought are very important; the independent outbreak of the disease, beyond the track of pilgrims, is also insisted on. Why the Ooriahs should be peculiarly exempt from dysentery is a question worthy of careful study. Dr. Davies recommends the formation of a Municipal Commission, and believes that endemic cholera might be "stamped out" if proper steps were taken. I would rather see some special sanitary organization brought to bear on all those parts of Orissa which are known as pilgrim routes. It is particularly to be desired that a more extended report may be furnished on the subject of "Nungnunglea rootstock," which is employed for criminal purposes.

39.—CUTTACK.

The report, by Dr. McDonald, is a good one. It is satisfactory to know that local improvements are being carried out at Cuttack, and that the drainage of the place receives attention. It is stated that the bodies of pilgrims often remain unburied; this should not be allowed. The tanks should be more carefully guarded. Dr. McDonald reports that, in the district, the corpses of pilgrims are sometimes cast into pools near villages. This most objectionable practice should be systematically and firmly opposed, as it must be a source of danger to public health; slaughter-houses should be constructed; and butchers ought to be compelled to dispose of offal more carefully than they do at present. The general nuisances mentioned by Dr. McDonald ought to be prohibited. From personal inspection of Cuttack I should say that it is kept cleaner than most places in Bengal.

40.—POOREE.

The report, by Dr. W. D. Stewart, is a very good one indeed.

Still the insanitary conditions of Pooree remain unabated, where, more than almost anywhere else in India, reform is needed. Dr. Stewart's pictures of the place fully corroborate all that I laid before the Government on this subject last year. It would be almost impossible to conceive a place more destitute of all proper sanitary arrangements. No drainage—no conservancy—sewage-contaminated wells—tanks charged with every animal and vegetable impurity—arrangements for cremation and burial as bad as they can possibly be, submerged streets—filthy lanes—greatly over-crowded dwellings—innumerable cess-pits, neglected cowsheds—ditches and hollows unapproachable from their loathsomeness. Such are (in simple truth and without a shade of exaggeration) the conditions under which many thousands of pilgrims are crowded together, suffering from malarious disease, splenic cachexia, dysentery, cholera, elephantiasis, syphilis, leprosy and all the most terrible diseases known to man. I anxiously trust that the Government will take up the subject of the sanitation of Pooree. To evade it would be to allow one of the greatest evils now existing in India to remain unabated and ignored. What is wanted is a Health Officer with an efficient staff, and systematic engineering; dispensaries on the high-roads; and the introduction of the long proposed Lodging-house Bill. As I wrote in my report of last year: Pooree must be thoroughly, cleansed; scavengering must be systematic and long continued; nuisances must be prohibited; sanitary Police must be oragnized; overcrowding must be prevented; the potable waters of the place must be analyzed, and conserved by stringent administrative regulations; local drainage must be rendered efficient; and sanitary engineering must be called in to the aid of chemistry, hygiene and medicine. In every sanitary respect a discriminating but firm authority must be exercised. Failing all this, Pooree must still continue, from one generation to another, to be the ever-open-grave of throngs of pilgrims. I will only here add that the Medical Officer, now on the spot, Dr. W. D. Stewart, would make an excellent Health Officer. To effect real good, however, sanitation should be his exclusive duty; he should have special powers, money at his command, and an efficient conservancy establishment. I anxiously urge the Government practically to recognize the importance, and vigorously to face the difficulties of this great work, which closely concerns the happiness and welfare of people from every part of India.

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From the above it will be seen that reports have been received from every part of that vast country which is bounded to the north by Nepaul, Sikkim, Bhootan and Cooch-Behar; to the south by the Bay of Bengal; to the north-west by the North-Western Provinces; to the south-east by British and independent Burmah; to the south-west by the frontier of the Madras Presidency, and the Gurjat Mehals; to the west by the Central Provinces; and to the eastward by the Brahmapootra, the Khasi and Garrow Hills and Cachar. The territory within these limits stretches over seven degrees of Latitude and very nearly nine of Longitude;—Pooree being in 19° 48' North, and Darjeeling in 27° North; whilst the north-eastern limit of Tirhoot is in Longitude 84° East, and the Chittagong District between 91° and 92° East.

It would have been very interesting to illustrate this report with epidemic charts and mortality maps, showing at a glance the history of endemic and epidemic diseases during the year under report; but I have found this to be impossible. I hope, however, that in the course of time it may be found possible to accomplish such a work.

Long as the extracts taken from the district reports may appear, it has been necessary to omit much that is of great interest. The following are among the subjects upon which careful information was supplied, much of which it has been deemed advisable, from the length of this report to withhold: The physical characters of districts; the number and course of rivers; geological peculiarities of soil; modes of irrigation; extent of cultivated and non-cultivated lands; trees; crops; imports; exports; diet of the people; past history of famine or distress; domestic habits and customs of the people; treatment of disease; lists of indigenous drugs; clinical and pathological observations, &c.

Almost all the reports are very creditable; not a few of them are excellent, and I cannot refrain from particularizing these. I consider that the thanks of Government are fully due to the undermentioned Officers; and I shall be truly glad if His Honor the Lieutenant-Governor will permit me to convey, to the gentlemen here named, an acknowledgment, on the part of the State, of the willingness, energy and toil with which they have furthered the cause of sanitation in these Provinces:

1. Dr. Bholanauth Bose of Furreedpore.
2. Dr. Kenneth McLeod, lately Civil Surgeon of Jessore, now at Julpigoree.
3. Surgeon-Major Feming, Civil Surgeon of Berhampore.
4. Dr. J. F. Wise, Civil Surgeon of Dacca.
5. Dr. H. C. Cutcliffe, now Officiating for Doctor Wise.
6. Dr. John French, Civil Surgeon of Rampore Beauleah.
7. Dr. Russell of Gya.
8. Dr. W. D. Stewart of Pooree.
9. Dr. Sheridan of Beerbhoom.
10. Dr. Cameron of Monghyr.
11. Dr. Henry Wilson of Mymensing.
12. Dr. Grant of Koosteah.
13. Dr. Greene of Tipperah.
14. Dr. Mantell of Burdwan.
15. Dr. E. J. Roberts of Raneegunge.
16. Baboo Unnoda C. Kastogree of Maldah.
17. Dr. William Wilson of Pooroolia.
18. Dr. Clement Sconce of Chumparun.

I would not have it inferred that all the other reports were wanting in value; *such is by no means the case.* Those received from Hazareebaugh, Bhaugulpore, Noacolly, Burrisaul, Midnapore, Balasore, Cuttack, Chyebassa, Bancoorah, Deoghur, Rungpore and Pubna are all good and creditable, although perhaps not so pretentious and laborious as those first named.

Dr. S. Coull Mackenzie well deserves acknowledgment for his careful report on Nattore; as do likewise the Sub-Assistant Surgeons at Bhowanipore and Cutwa.

Part IV.

GENERAL OPINIONS

ON THE

HEADING SUBJECTS OF SANITATION IN BENGAL.

Part IV.

It remains for me to generalize upon the more important sanitary topics that present themselves for study in Bengal.

Topography.

The varying topography of districts is a matter deserving of the closest attention. The altered and altering condition of rivers and of *khâls* involves questions of the very first importance. Indeed, one would be almost justified in asserting that the history of rivers and of water-courses, generally, in Bengal, is the key to the sanitary history of the country. Is a river broad and deep? Not only does its condition ensure commercial prosperity to the people residing on its banks, but health, happiness, and comparative social vigor are everywhere conspicuous near it. Do the waters commence to leave their former course? Does the river-bed silt and contract? From that day commences the decay of places on its original banks; trade declines; public health deteriorates; the water supply is vitiated, epidemics prevail as they did not before, and a long cycle of adverse sanitary and social events has had its beginning. What occurs in the case of cities and of large places on large rivers, is equally seen, on a smaller scale, as regards the fate of villages situated on streams and creeks, when these become shallow and obstructed. Thus, the history of Bengal, in a sanitary point of view, is the history of its rivers and water-courses. It is to be hoped, that much greater attention will be devoted to this subject in the future than has obtained in the past. Civil Surgeons, and Civil Officers generally, should keep careful note of the variations of Bengal rivers, and Government will do well to require, of Engineer Officers, searching reports on the same subject. I hope I may be excused for thus dwelling on a matter, the importance of which, sanitarily, has not been fully realized. Time and extended observation will, I believe, prove that there is a closer connection than most persons may be inclined to believe, between prevailing rates of sickness and mortality, and the depth and fullness, or the reverse, of Indian streams in delta tracts.

Climate.

As regards a better and more precise knowledge of the climate of Bengal, this rests, to a great degree upon those improvements in the working of the Meteorological Department which Government is now trying to bring about.

Conservancy.

Regarding schemes of conservancy and sanitation, these are discussed in a general manner in the last Appendix to this Report (Part V.)

I incline to the opinion that dry-earth conservancy is, on the whole, preferable in India, to systems of water-carriage sewerage. The latter method is in progress in Calcutta, and we shall learn much by watching the results of it there. Meanwhile for other towns, and for places, generally, in the district, I recommend the dry-earth system, and the utilization of night-soil on ground specially selected for the purpose. If municipalities will take up this matter in earnest, I believe they will be amply repaid from the value of the products of cultivation, conducted on more scientific principles than one generally meets with in India.

Dwellings of the poor.

It is to be hoped that the day will ere long come, when the dwellings of the people will be improved in India, as they have been in England. There is probably no country in which the physical condition of the very poorest classes more requires improvement and raising to a higher standard, than in India. A great *desideratum* is to raise every individual poor man a little; if this be done, the fate of the more independent classes will be much more easily regulated.

Sanitary reform.

I would fain see Indian sanitary reform pushed, *simultaneously*, amongst the very poor and the richest classes. All should be taught that their own fate, and that of others to a great degree lies in their own hands. It has been said: "The Turk, when he tries a new gun, fires across a public street, or into the bay thronged with shipping. When he digs a well for water, he leaves it unprotected. If any one be in the way of the bullet, or stumble into the well in the dark, it is the will of Allah, and no one troubles himself about the matter?" Much of the same blind, un-reasoning spirit, regulates the daily actions of the people of Bengal, and it is against this that the Sanitarian's efforts must be specially directed. The minutest details in preventive science must be insisted on, and their vital importance brought to notice.

The three most important sanitary requirements in India.

With these hasty preliminary remarks, I pass on to a consideration of the various topics of most general sanitary importance;—merely premising that of all urgently required sanitary measures in Bengal, the most important and urgent are these: good water-supply, efficient drainage, proper conservancy, and careful disposal of the dead.

The following is the *Geographical position of the stations* referred to in the foregoing report.

Howrah	... Lat.	23° N.	Long. ...	88° E.
Hooghly	... „	22° 51′ 59″	„ ...	88° 26′ 38″ E.
Jessore	... „	23° 9′	„ ...	89° 7′1′
Nuddea (District)	... „	22° 50′ to 24° 10′	„ ...	88° 50′ to 89° 30′
Berhampore	... „	24° 5	„ ...	88° 7′
Furreedporo	... „	23° 41′	„ ...	89° 52′
Burrisaul	... „	22° 30′	„ ...	90° 15′
Dacca (District)	... „	between 23° and 24° N.	„ ...	90°
Mymensing (District)	... „	24° 4 to 25° 41	„ ...	89° 28 to 91° 13′
Comillah (Tipperah)	... „	23° 27′	„ ...	91° 34′
Noakolly	... „	23°	„ ...	91°
Kooshtea	... „	23° 54	„ ...	89° 10′
Pubna	... „	24° 8	„ ...	89° 15′
Rampore Beauleah	... „	24° 21′ 8″	„ ...	88° 34′3″
Maldah (District)	... „	from 24° 31′ 50″ to 25° 28′ 30″	„ ...	87° 48′ 38″ 33′ 30″
Rungpore	... „	25° 42′ 8″	„ ...	89° 11′ 4″
Julpigoree	... „	26° 32′ 20″	„ ...	88° 45′ 37″
Darjeeling	... „	27°	„ ...	88° 22′
Burdwan	... „	23° 12′	„ ...	87° 56′
Bancoorah	... „	23° 14′ 8″	„ ...	87° 6′ 3″
Raneegunge	... „	23° 3′ 3″	„ ...	87°
Soory (Beerbhoom)	... „	23° 54′	„ ...	87° 33′
Rajmehal	... „	25° 2	„ ...	84° 43′
Deoghur	... „	24° 29′	„ ...	86° 45′
Pooroolia	... „	23° 26′ 30″	„ ...	86° 22′ 30
Chyebassa	... „	22° 32′ 53″	„ ...	85° 50′ 53″
Hazareebaugh	... „	24°	„ ...	85° 24′
Bhaugulpore	... „	25° 15′	„ ...	87°
Monghyr	... „	25° 19′	„ ...	86° 30′
Gya	... „	24° 46′ 13″	„ ...	84° 58′ 45″
Patna	... „	25° 37′ 12″	„ ...	85° 7′ 32″
Mozufferpore	... „	26° 7′ 57″	„ ...	85° 26′
Chumparun (District)	... „	26° to 27°	„ ...	84° to 85°
Miduapore	... „	22° 24′ 17″	„ ...	87° 17′ 53″
Balasore	... „	21° 30	„ ...	87°
Cuttack	... „	20° 28′ 45″	„ ...	85° 50′ 50″
Pooree	... „	19° 48′	„ ...	85° 49′

Geology.

The subject of the relation of particular soils to the prevalence of endemic and epidemic diseases has by no means attracted the attention it merits. It is true a certain apparent sameness of alluvial deposit occurs over the greater part of Bengal Proper; but when we regard the Lower Provinces as a whole, we find that the older geological formations appear at different places, and bear their share in modifying climate by facilitating or obstructing natural drainage, and in many other ways. " Without the surface soil " writes Dr. McClelland, " Bengal would be a swamp, and without the clay it would be a desert." It is to be hoped that ere long charts may be drawn up showing, side by side, the geological features of districts and the diseases which most prevail throughout their limits. At present, I am unable, from the reports before me, to produce anything of this kind. One fact is certain that we find fevers, cholera and dysentery in all directions: in the swampy tracts of the Soonderbunds; on the sedimentary rocks at Chittagong; on the low hills of Tipperah; over the vast fields of silt which form the Gangetic plains; in the undulating country of Rajmehal and the Sonthal Pergunnahs, where clay-slate and gneiss abound; on the coal fields of Burdwan; and on the primitive rocks of Behar; throughout Orissa, with its laterite; on the Savannahs and in the glades and dense jungles of the Terai; on the calcareous tracts adjoining the outer mountain ranges; on the stretch of sand along the Brahmapootra; on the hornblende around Parisnath; on the syenite of the hill itself; and on the black mould at its summit; on the elevated table lands of Chota-Nagpore; and even on the micaceous slate of Darjeeling, 7000 feet above the sea, (I say this advisedly, being familiar with the pleasing fiction that intermittents and cholera are never supposed to reach such altitudes.)

It still remains for medical men eagerly to co-operate in defining the proportionate rates of prevalence of these and other diseases on various soils and at different latitudes and altitudes. In this great work of determining the geography and chronology of Indian disease, we must seek the assistance of the geologist and meteorologist, and further, it will be necessary not only to regard the varied structure of soils and their inclinations, but also their chemical composition and their electrical states, the variations in temperature which they present, and the chemical and other changes which they may be liable to produce in the water-supply of the country. This is a most complex and wide subject, the extended study of which must throw great light on many of the most important considerations connected with the distribution and fatality of disease in India.

Meteorology.

I do not think the meteorological records, furnished in the reports, taken as a whole, are very exact or valuable. Such as they are I publish them. In some cases they have been carefully kept, as for instance, by Dr. Kenneth McLeod of Jessore, Dr. Fleming at Berhampore, Dr. French at Rampore Beauleah, Dr. Cameron of Monghyr, Dr. Bedford Allen at Midnapore, and particularly during the months of June and July, (cholera months) by Dr. Delpratt at Hazareebaugh. Careful and highly interesting observations are also published in the report of the Inspector General of Jails, as having been kept by Dr. Jackson at Meetapore.

I shall be glad if the Meteorological Recorder can gain any information of value in the Tables submitted by Civil Surgeons. It is to be observed that they do not altogether coincide with the returns published by Mr. Blanford in *his* Annual Meteorological Report. Discrepancies in themselves, however, are instructive, and will doubtless lead to improvements in the entire system of scientific record in India. The extension of the present meteorological department is, in the interests of sanitary science, much required. The record of false facts is apt to prove misleading, and in no department is well trained and skilled labour more requisite. We have now, it is true, a Meteorological Reporter for Bengal, appointed in 1866, and his reports present us with numerous very important observations. There is also a reporter in the North Western Provinces and in the Punjab, and a good observatory at Lucknow. All this is in the right direction. It is to be hoped, however, that the establishments under the superintendence of the officers alluded to will greatly increase in size and efficiency. It would be most interesting were a uniform Meteorological Gazette published regularly (say every quarter) *for the whole of India,* showing in abstract—in carefully tabulated form—the variations in each province, as regards the records of temperature barometric pressure, humidity, dew-point, rain-fall, direction and force of wind. These, compared with the reports of public health, would be most instructive,—even although the deductions derivable from them should be of a negative character. Observations on the temperature of *rivers* and of *soils,* at different seasons, are also much wanted.

Mr. Henry F. Blanford, the Meteorological Reporter to the Government of Bengal, has kindly favoured me with the following memorandum of the meteorological peculiarities of the period under review:

"The chief characteristics of the meteorology of Bengal during the year 1868, were *a prevailing high barometric pressure, low temperature, and excessive total rain-fall.* It would appear from the records of the Calcutta observatory that, notwithstanding this last feature, *the mean atmospheric humidity was less than the average and has been decreasing for the last sixteen years.* This observation would in any case, apply to Calcutta only, and I have shewn in my report that there are grounds for hesitating to accept this apparent change as an established fact.

The excessive rain-fall was felt only in Lower Bengal, *i. e,* the Gangetic Delta and to the eastward, *viz.,* in the districts bordering on our Eastern Frontier. To the west and north-west there was a deficiency of rain-fall.

In Bengal, Calcutta is the only station which at present can furnish a continuous register for many years. A comparison of the principal meteorological elements of 1868, with their corresponding averages for the period of sixteen years during which hourly observations have been recorded yields the following results:

	Barometer.		Thermometer.		Humidity.	
	Mean.	1868.	Mean.	1868.	Mean.	1868.
January	30·025	+·016	67·6	+0·7	71·	—4·
February	29·948	+·008	72·8	—0·7	68·	—2·
March	·859	+·026	80·5	—1·	67·	—4·
April	·757	+·017	84·5	—1·4	69·	+2·
May	·655	+·109	86·	—1·7	73·	+1·
June	·543	+·009	84·9	—1·3	81·	+3·
July	·536	+·048	83·5	+0·7	85·	+0·
August	·592	—·006	83·	+0·3	86·	+1·
September	·634	—·002	83·2	—0·1	85·	+1·
October	·834	+·028	81·4	+0 8	78·	—4·
November	·966	—·003	74·7	+0·3	73.	—5·
December	30·029	+·023	67·8	+0·9	72·	—5·
Mean	29·781	+·023	79·1	—0·2	75·6	—1·3

Rain-fall.

	Mean.	1868
January	0·41	— 0·36
February	0·76	— 0·58
March	1·13	— 0·97
April	2·13	+ 3·34
May	5·78	+ 0·02
June	12·64	+13·97
July	13·19	— 2·02
August	14·70	+10·13
September	10·94	+ 4·75
October	5·46	— 3·93
November	1·09	— 1·09
December	0·10	— 0·10
Total	68·33	+23·16

The wind directions of past years have not yet been sufficiently discussed to admit of a similar comparison.

Thus it appears that the months of January, February and March, and October and November were *drier than the average*, both in point of invisible humidity of the atmosphere, and in the amount of rain-fall; and that the excessive rain-fall of the year was due mainly to the very heavy falls in June and August."

Mr. Blanford's Annual Report contains much that is of great interest in its bearings on the prevalence of certain diseases. I have extracted and compiled the following tables and statements from his published report:

Barometric mean monthly pressure and range at the following stations, for 1868.

	CALCUTTA.		CUTTACK.		CHITTAGONG.		JESSORE.		DACCA.	HAZAREEBAUGH.		BERHAMPORE.		PATNA.		MONGHYR.		DARJEELING.	
	Mean.	Range.	Mean.	Range.	Mean.	Range.	Mean.	Range.	Mean.	Mean.	Range.	Mean.	Range.	Mean.	Range.	Mean.	Range.	Mean.	Range.
	o		o		o		o		o	o		o		o		o		o	
January ...	30·040	·137	29·954	·126	29·917*	·095	30·029*	·133	......	27·987*	·096	29·964*	·093	......	......	......	......	23·312	·077
February ...	29·957	·133	29·889	·131	29·861*	·088	29·945*	·131	29·970	27·911*	·090	29·897*	·121	29·805*	·103	......	......	23·297	·062
March	29·886	·132	29·813	·125	29·798*	·091	29·875*	·119	29·901	27·878*	·091	29·622*	·137	29·703*	·129	......	......	23·324	·068
April	29·772	·130	29·694	·137	29·712	·104	29·761*	·128	29·803	27·780*	·095	29·700*	·150	29·590*	·111	29·591*	·163	23·304	·075
May	29·763	·120	29·672	·120	29·692	·102	29·746*	·120	29·790	27·759*	·084	29·700*	·123	29·569*	·119	29·550*	·158	23·341	·063
June	29·552	·085	29·530	·076	295·15	·071	29·526*	·097	29·573	27·578*	·065	29·471*	·098	29·357*	·079	29·364*	·108	23·214	·060
July	29·585	·085	29·533	·075	29·546	·071	29·570*	·052	29·595	27·567*	·094	29·514*	·098	29·370*	·092	29·391*	·104	23·230	·045
August	29·586	·091	29·486	·093	29·519	·077	29·553*	·088	26·565	......	......	29·514*	·004	29·402*	·086	29·412*	·096	23·235	·048
September ...	29·681	·110	29·652	·102	29·638	·084	29·675*	·095	29·698	......	......	29·621*	·115	29·495*	·105	29·528*	·105	23·311	·061
October ...	29·865	·112	29·841	·103	29·778	·111	29·848*	·097	25·855	27·897	·090	28·816*	·11	29·699*	·104	29·734*	·117	23·391	·061
November ...	29·965	·124	29·936	·111	29·852	·094	29·935*	·114	29·959	27·968	·090	29·923	·119	29·813*	·115	29·840*	·113	23·408	·070
December ...	30·055	·129	30·013	·119	29·935	·092	30·037*	·120	30·046	28·019	·106	30·014	·131	29·892	·110	29·921	·084	23·388	·065

Barometric monthly means reduced to Sea level, 1868.

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Port Blair	....	....	......	......	......	29·810*	29·835*	29·819*	29·853*	29·891*	29·928*	29·982*
Madras ...	30·015*	29·992*	29·941*	29·841*	29·800*	29·742*	29·756	29·772*	29·792*	29·892*	29·955*	30·037*
Akyab	2·993*	29·956	29·913	29·877	29·850	29·753	29·756	29·720	29·797	29·874	29·907	30·023
False Point	30·017	29·946	29·884	29·763	29·376	29·567	29·562	29·575	29·654	29·843	29·953	30·048
Cuttack	30·038	29·973	29·896	29·776	29·754	29·613	29·615	29·568	29·735	29·924	30·020	30·097
Chittagong	30·021*	29·974*	29·909*	29·823	29·802	29·626	29·657	29·630	29·749	29·922	29·964	30·048
Saugor Island ...	30·048*	29·919*	29·902*	29·757*	29·736	29·522	29·535	29·475	29·516	29·807	29·936	30·055
Calcutta	30·059	29·976	29·904	29·790	29·781	29·570	29·603	29·601	29·699	29·868	29·983	30·074
Hazareebaugh ...	30·063*	29·948*	29·890*	29·789*	29·720	29·546*	29·509*	P	P	29·953	30·010	30·093
Jessore	30·045*	29·961*	29·885*	29·776*	29·761*	29·541*	29·584*	P	29·695*	29·863*	29·950*	30·053*
Berhampore	30·053*	29·976*	29·894*	29·777*	29·777*	29·547	29·590*	29·590*	29·715*	29·882*	30·003	30·093
Dacca	....	30·013	29·942	29·844	29·831	29·614	29·636	29·605	29·739	29·896	29·999	30·088
Monghyr	....	....	......	29·742*	29·701*	29·515*	29·542*	29·564*	29·679*	29·878*	29·996*	30·078
Patna	....	29·984*	29·878*	29·762*	29·740*	26·549*	29·542*	29·574*	29·684*	29·872*	29·989*	30·074
Benares	30·214	30·020	29·928	29·883	29·747	29·570	29·573	29·621	29·710	29·902	30·038	30·125
Roorkee	30·085	30·004	29·914	29·763	29·694	29·491	29·517	29·523	29·658	29·861	30·000	30·091

Comparative Table of mean monthly Barometric pressures at Calcutta, for the years 1853-1868.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Mean.
Mean ...	29·948	30·025	29·859	29·757	29·655	29·543	29·536	29·592	29·634	29·834	29·966	30·029	29·781

Temperature of Calcutta.

	Means for 1868 of.				Mean for 16 Years.
	4h. 10h. 16h. & 22h.	Min. & Max.	Min & 16h.	Hourly obs.	Of hourly obs.
January	68·6	68·8	68·3	68·3	67·6
February	72·6	72·8	72·5	72·1	72·8
March...	80·0	80·5	80·2	79·5	80·5
April	83·5	84·	83·1	83·1	84·5
May	84·6	85·2	84·2	84·3	86·
June	83·8	83·8	83·1	83·6	84·9
July	84·4	84·8	84·1	82·2	83·5
August	83·5	83·7	83·1	83·3	83·
September	83·2	83·8	82·8	83·1	83·2
October	82·4	82·7	82·1	82·2	81·4
November	75·2	75·6	74·9	75·	74·7
December	69·0	69·3	68·6	68·7	67·8

This table shows that, while the months of January, July, August, October, November and December were somewhat above the average temperature, the hot weather months and the first month of the rains were considerably below the mean. The differences are as follow:—

January	...	+0·7	July	...	+9·7
February	...	—0·7	August	...	+0·3
March	...	—1·0	September	...	—0·1
April	...	—1·4	October	...	+0·8
May	...	—1·7	November	...	+0·3
June	...	—1·3	December	...	+0·9

Mean of year—0·2

Mean Monthly Temperature of the following Stations for 1868.

	Calcutta.	Cuttack.	Chittagong.	Jessore.	Dacca.	Darjeeling.	Hazareebaugh.	Berhampore.	Patna.	Monghyr.
	Mean.	Mean.	Mean.	Mean.	Mean.	Mean.	Mean.	Mean.	Mean.	Mean.
January	68·6	69·3	......	64·4*	......	42·1	60·0*	63·8*	58·3*	60·6
February	72·6	74·0	......	67·9*	71·1	41·6	60·6*	67·4*	61·5*	64·9
March	80·0	79·0	......	77· *	78·4	50·4	72·3*	75·8*	76·9*	74·9
April	83·5	86·0	80·1	76·6*	80·6	55·0	81·2*	......	77·8*	82·5
May	84·0	87·5	82·6	80·3*	82·4	58·9	81·4*	84·1*	80·5*	84·2
June	83·8	83·4	81·4	81·7*	82·8	64·1	79·1*	84·3*	83·7*	85·7
July	84·4	84·6	81·0	82·5*	83·0	63·9	83·1*	84·5*	84·9*	84·6
August	83·5	84·2	81·7	82·1*	83·8	65·1	78·7	83·8*	82·6*	82·9
September	83·2	83·1	81·5	81·1*	83·2	62·8	77·8	82·8*	82·0*	83·8
October	82·4	81·2	80·3	78·2*	81·4	58·0	75·1	81·4*	78·4*	79·0
November	75·2	73·2	75·3	72· *	76·3	51·2	68·3	73·1*	67·9*	70·5
December	69·0	68·7	69·2	63·8*	69·8	43·7	61·9	65·6*	61·3*	62·3

Mean Monthly Humidity of Calcutta.

	MEAN MONTHLY HUMIDITIES FOR 1868.			Mean of 16 years' hourly observations: by Glaisher's Factors.
	From 4 Observations.		From Hourly Obs. by G. F.	
	By August's Formula.	By Glaisher's Factors.		
January	66°	67°	67°	71°
February	67	67	66	68
March	65	65	63	67
April	73	72	71	69
May	77	75	74	73
June	85	83	84	81
July	86	84	85	85
August	88	86	87	86
September	88	86	86	85
October	76	74	74	78
November	69	68	68	73
December	66	68	67	72

" This table would seem to show that the humidity of Calcutta, in the months April to August of the past year, was somewhat above the mean of the sixteen years during which hourly observations have been recorded; but that this excess was more than compensated by the dryness of the remaining months, so that, on the whole, the humidity of the year was slightly less than the average in the proportion of 74·3 to 76. This result is, at first sight somewhat striking, for, as will be shewn by the rainfall tables, the rainfall of the past year was heavier than that of any year on record; but a further examination of the observatory registers of past years will show (if, indeed, they can be accepted as trustworthy) that this apparent anomaly of low mean humidity, coinciding with heavy rainfall, is by no means exceptional. On comparing, for instance, the three periods 1853-58, 1859-63 and 1864-68, it would appear that the mean humidities, and mean rainfalls bear a certian inverse relation to each other, thus:—

	Mean annual rainfall.	Mean annual humidity.
1853-58	63·64	77·9
1859-63	69·00	76·1
1864-68	75·95	73·6

and, therefore, that notwithstanding the excessive rainfall of late years, either owing to better drainage or some other cause *the mean humidity of the atmosphere is considerably decreased.* That this *may be* the real explanation I am not prepared to deny, for there is no immediate and necessary connection betwen the total annual rainfall of a place and its mean humidity; and it may be conceded that, owing to local changes, the atmospheric humidity of a given place may be lessened, although, from independent causes, its rainfall may increase. Before, however, any discussion can profitably be entered on, the preliminary question has to be considered—"Can the data be accepted as thoroughly trustworthy?" And seeing how readily the indications of the wet bulb thermometer (the only instrument used) are affected by neglect or alteration of the arrangement for moistening the bulbs or by variation in the position of the instrument; and how easily, therefore the humidity of the air, as calculated therefrom, may be represented in excess of the truth, it is important that this question be satisfactorily answered. For my own part I am not prepared to answer it, nor can it be answered by any one who has not been intimately conversant with the observatory practice from the beginning. Unfortunately but one series of observations, as far as I am aware, is extant; and if this be so, the whole question of the increasing dryness of Calcutta (one of great interest in a sanitary point of view) must rest on the credibility to be attached to the results of that series.*

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* It was pointed out by the Meterological Committee, in a Report dated 18th December, 1867, that the site of the present Meterological Observatory is objectionable on many grounds. It is peculiarly so with reference to the humidity observations. The thermometer shed, in which the hygrometer is exposed, is in an enclosure of very moderate size surrounded by lofty buildings, and stands on the edge of a tank which occupies a large part of the enclosure. Differences in the height at which the water stands in this tank most greatly affect the moisture of the atmosphere of the place. From this reason alone and supposing there be no other, I think considerable doubt must attach to the value of the humidity observations. No orders have yet been passed on this part of the Report.

Mean Monthly Humidities (Saturation=100) at the following Stations,—for 1868.

	Cuttack.	Calcutta.	Chittagong.	Dacca.	Hazareebaugh.	Darjeeling.
	Mean.	Mean.	Mean.	Mean.	Mean.	Mean.
January	74	66	......	......	......	79
February	73	67	......	75	......	82
March	65	65	......	77	......	71
April	68	73	83	83	.. ...	83
May	71	77	83	86	......	81
June	82	85	90	93	......	91
July	81	86	90	94	......	94
August	81	88	94	94	......	93
September	81	88	90	93	85	89
October	74	76	84	83	60	78
November	64	69	80	77	51	75
December	68	66	70	71	49	75

The rainy season of 1868 was characterised by a fall of rain in Lower Bengal, much above the average; in Calcutta, indeed, the quantity registered is the highest on record; while in the North-West Provinces and a portion of Behar, there was a deficiency of the usual rainfall. The following table will serve to illustrate this fact by presenting a comparative view of the rainfall of 1868, and the mean rainfall of several years at seven selected stations :—

STATION.	Rainfall 1868.	Difference.	Mean Rainfall.	Mean deduced from.	
				Years.	Periods.
	Inches.	Inches.	Inches.		
Madras	47·48	− 1·42	49·90	32	
Calcutta	91·49	+ 24·53	66·96	32	1837-68
Dacca	76· 6	+ 5·64	71·14	10	8 years [Dove] 1851, 1868.
Berhampore	61·87	+ 10·06	51·81	9	1851, 57-59, 64-68.
Darjeeling	135·34	+ 9·71	125·63	5	1851, 57, 59 1868.
Benares	31·95	− 4·28	36·23	8	63-1851, 58-59 65, 67-68.
Roorkee	27·39	− 8·10	35·49	7	1860, 63-68.

The periods for which the averages are taken are too short to admit of anything like exact results, except, perhaps in the cases of Calcutta and Madras, but they are sufficient to afford evidence of the fact noticed above.

It may be observed that in Lower Bengal nearly the whole of the excessive fall occurred in the months of June and August. In July the quantity was somewhat below the average, and the six months January to March and October to December were unusually dry. These variations coincide with the variations in the humidity of the atmosphere, as shewn at page 40, and afford a partial explanation of the apparently anomalous coincidence of high total rainfall and low mean humidity. Of course they throw no light on the question of a supposed secular decrease of humidity in Calcutta.

The following table shews the rainfall of Calcutta, month by month, for the last sixteen years, as registered at the Surveyor General's Office, and exhibits the fact already noticed at page 45, that during the later years of the above period, there would appear to have been a greatly increased rainfall as compared with the earlier years; and on carrying the comparison still further back, *viz.*, for thirty-two years, it would at first sight appear that with certain oscillations of many years duration, there has really been a tendency to increasing rainfall; for the mean of the first five years of the period 1837-41 amounted to only 56·25 inches. If we admit the accuracy of the data it would seem that during these five years the rainfall was exceptionally light (every year being below the thirty-two years' mean) and on the other hand that the rainfall of the years 1861, 1864, and 1868 was greatly in excess of the same mean, or indeed of the fall of any previous year of the period. But, in spite of this, the variations are not of sufficient regularity to indicate the detailed operation af any definite law, even were the trustworthiness of the data for the earlier years beyond question, a point on which, I am unable to give any assurance."

Table of Monthly and Annual Rain-fall at Calcutta, for the 16 *years,* 1853-68.

MONTH.		1853.	1854.	1855.	1856.	1857.	1858.	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	Mean of 16 years.
January	...	0·10	...	0·46	1·06	...	0·07	...	...	0·5	1·03	...	...	0·48	1·91	0·55	0·05	0·41
February	...	...	1·01	1·11	...	...	0·54	0·66	0·09	...	...	1·20	0·47	1·86	3·74	0·82	0·18	0·76
March	..	...	1·28	0·14	2·23	0·96	0·22	4·23	...	0·88	1·69	...	1·84	1·96	...	1·51	0·16	1·13
April	...	1·00	7·25	3·83	0·62	1·80	0·97	1·29	2·47	0·31	2·53	2·43	1·11	4·28	1·81	0·27	5·47	2·13
May	...	2·42	3·75	5·97	8·18	9·33	3·28	3·18	2·21	9·07	3·80	4·20	10·36	15·94	2·56	2·45	5·80	5·78
June	...	8·27	16·82	5·84	12·67	10·30	8·22	12·48	6·46	26·44	13·63	12·93	18·73	8·63	7·02	7·21	26·61	12·64
July	...	12·76	10·60	19·18	10·94	12·98	17·96	9·09	17·92	10·93	13·31	11·22	13·09	12·19	13·42	15·40	11·17	13·19
August	...	13·44	11·59	11·07	10·30	18·70	14·65	21·22	14·65	16·12	12·03	14·10	16·64	5·99	11·48	18·50	24·83	14·70
September	...	9·15	9·26	19·39	9·02	13·30	4·74	11·55	7·13	12·48	10·86	10·33	12·59	...	15·97	13·70	15·69	10·94
October	...	4·94	4·01	3·38	9·21	1·60	8·03	4·96	1·68	7·75	14·40	3·48	6·50	...	7·83	8·12	1·53	5·46
November	...	...	0·90	...	...	...	...	...	...	4·30	...	1·26	2·89	...	...	8·19	...	1·09
December	...	...	...	...	...	...	1·08	...	...	0·26	0·20	...	...	...	...	..	...	0·10
Total	...	52·08	66·47	70·37	64·23	68·97	59·76	68·66	52·61	89·10	73·48	61·15	84·22	61·58	65·74	76·72	91·49	68·33

From the above many important conclusions might be drawn. The following are a few of these :

1. As a rule (though it is not without its exceptions) the principal cholera months have a high barometric range.

2. The Barometric mean pressure of December and January is almost invariably high, and the mean monthly humidity lower than the so called chief cholera months.

3. The mean temperature of the cholera months in Calcutta is considerably higher than that of December and January.

4. The Thermometric range of the cholera months in Calcutta is high as compared with other months, and yet low when compared with observations recorded during the same months at up-country stations.

5. In 1868 the mean temperature of the hot months was below the mean of sixteen years.

6. The mean Barometric pressure seem to be increasing at Calcutta.

7. The mean humidity of Calcutta in 1868 is below the average.

8. Whilst the rain-fall for the same period is the highest on record since 1853.

The two last facts, as pointed out by Mr. Blanford, are of great interest. It is very remarkable that the humidity of the atmosphere of Calcutta should have been decreasing for the past sixteen years whilst the rain-fall has contemporaneously been on the increase. It is however possible that the humidity observations at the Surveyor General's office are not reliable, in consequence of there being a tank which varies 12 feet or more in height, on the margin of which the thermometer-shed is situated. It is greatly to be regretted that such a source of possible, if not of probable error should exist. Indeed there are, I believe, many excellent reasons, besides that now alluded to, (which however in itself is of great weight) why the meteorological observatory of Calcutta should be altogether removed from its present situation. I believe it has been proposed by Mr. Blanford, to have it either on ground situated between the Kidderpore and Alipore bridges, or in the Eden Gardens. I hope the Government will sanction this change of position, as at present the records of a long series of years are open to question on grounds which might for the future be easily rectified. It is of the utmost importance that the humidity observations of Calcutta should be accurate beyond dispute. The earlier meteorological records of the place are to be found in the works of Sir Ranald Martin, McClelland, Kenneth Mackinnon, Macpherson, and Parkes, besides the Asiatic Society's Journal and other similar sources.

I have already casually alluded to Dr. N. Jackson's observations at the Meetapore Jail. They relate to the months of April, May, June, July and August, during which cholera prevailed, which seemed to originate in the Jail. Dr. Jackson found that cholera cases chiefly prevailed when the barometer was *low* and the thermometer high. "Rain ushered in the first case; yet the total fall for the five months was small, being 18·200 inches."

The outbreak was attributed to the bad quality of the water used by the prisoners. Dr. Jackson's observations as to barometric pressure being low during the prevalence of cholera, are opposed to the experience of Mr. Glaisher, in the London Epidemics of 1832, 1849 and 1854. But they correspond with what the same distinguished observer found to obtain in 1866. To give additional value to Dr. Jackson's observations it would have been well to adduce comparisons with former years, both cholera-producing and cholera-free. Dr. Jackson does not record the force of the wind, a point on which Mr. Glaisher lays stress. As regards temperature and rain fall the two sets of observations are in accord, but they differ as to humidity and barometric readings (I allude to Glaisher's earlier records.)

Mr. Delpratt has sent in a careful meteorological register kept at Hazareebagh during the months of June and July, with the number of cholera cases and the deaths occurring each day. These forms being good and carefully kept I think it well to reproduce them :

ABSTRACT *of Meteorological register kept at Hazareebaugh during the month of June,* 1868.

June.	Mean barometer readings reduced to 32.	Maximum temperature in shade.	Minimum temperature in shade.	Mean of dry bulb.	Mean of wet bulb.	Max : Sun's rays in vacuo.	Direction of wind. A. M. 4.	A. M. 10.	P. M. 4.	P. M. 10.	Total rain fall.		No. of cholera cases reported.	No. of deaths.
	°	°	°	°	°									
1st	27·749	90	67	83	74	136	......	E.	S. E.	......	·59	Thunder storm from S. at dawn—ditto in afternoon with rain ...	...	...
2nd	27·713	91	73	88	75	142	......	S.	S.	......	......	Clear warm day with small cir : overhead, large ones to S. ...	...	...
3rd	27·691	95	73	87	74	154	......	S.	S.	......	......	Ditto Ditto	...	...
4th	27·710	96	73	83	74	149	......	S.	S.	......	......	Ditto heavy cir : all round horizon	...	...
5th	17·660	97	74	88	74	153	......	S. E.	E.	......	......	Cool cloudy. Over-cast in evening. Raining to South ...	...	...
6th	27·672	95	74	85	75	159	......	E.	E.	......	......	Ditto slight shower	...	...
7th	27·611	92	72	75	73	154	......	N. E.	E.	......	·38	Quite overcast raining or drizzling all day	...	...
8th	27·538	83	72	77	75	109	......	N. E.	E.	......	1·09	Low scud. Now clear, now drizzling	...	...
9th	27·623	83	73	77	76	129	......	N. E.	E.	......	·10	Sun shine and shower alternately all day	...	...
10th	27·516	83	72	76	75	145	......	N. E.	N. E.	......	1·23	Ditto Ditto	...	...
11th	27·541	78	72	75	75	124	......	N. E.	N. E.	......	·72	Ditto Ditto	...	...
12th	27·422	78	72	75	75	132	......	N.	N.	......	1·48	Fewer showers. Thunder storm to South	...	...
13th	27·498	79	73	89	77	128	......	N. W.	N. W.	......	·63	Cloudy by day. Much rain by night	...	...
14th	27·510	80	73	77	77	145	......	N.	N.	......	.186	Thunder Storm from N. W. at dawn with heavy rain; double rainbow almost complete in evening	...	...
15th	27·456	86	73	75	76	143	......	N.	N.	......	1·28	Drizzling all day	...	...
16th	27·465	79	72	76	76	141	......	N. W.	W.	......	·49	Heavy intermitting showers by day, unremitting by night ...	...	...
17th	27·469	79	72	75	72	125	......	N. W.	W.	......	2·99	Lightning in South at dawn. Rain all day from west	...	...
18th	27·512	78	71	74	72	95	......	W.	W.	......	1·71	Strong west wind and low scud all day	9	5
19th	27·511	84	71	83	75	135	......	W.	W.	......	·47	Ditto very hazy. Red sunset	...	...
20th	27·579	89	76	85	74	133	......	W.	W.	......	......	Ditto Ditto	...	...
21st	27·570	91	74	87	78	147	......	W.	W.	......	......	Ditto Ditto heavy storm to North in evening	1	...
22nd	27·560	93	74	87	74	147	......	S. W.	W.	......	......	Light wind. Hot close wind	...	...
23rd	27·667	93	76	89	78	155	......	W.	N. W.	......	......	Ditto Ditto	...	...
24th	27·622	93	76	91	77	148	......	W.	N. W.	......	......	Ditto Ditto	3	2
25th	27·605	96	78	91	79	158	......	S. W.	W.	......	......	Ditto Ditto Rain on South West	4	1
26th	27·582	97	78	90	78	150	......	W.	W.	......	......	Ditto Ditto Ditto	3	...
27th	27·557	96	77	87	77	151	......	W.	W.	......	......	Overcast cool pleasant	1	2
28th	27·528	96	77	89	76	148	......	S. W.	N. W.	......	......	Hazy and hot cirro cir : very high up	5	3
29th	27·568	95	79	89	77	154	......	W.	N.	......	......	Cool and plesant, fresh breeze from N. W. ...	1	1
30th	27·557	94	77	88	77	151	......	W.	N. W.	......	......	Ditto heavy cir : to South Thunder and Lightning threatening rain in evening	1	1
												Total ...	28	15

ABSTRACT of Meteorological register kept at Hazareebaugh during the month of July 1868.

July.	Mean barometer readings reduced to 32°	Max. temperature in shade.	Minimum temperature in shade.	Mean of dry bulb.	Mean of wet bulb.	Max. Sun's rays in vacuo.	Direction of wind.				Total rain fall.		No. of cholera cases reported.	No. of deaths.
							A. 4	M.	P. 4	M. 10				
	°		°	°	°	°								
1st	27·567	93	74	86	77	154	......	S. W.	W.	......	·03	Cool and pleasant. Heavy storm South and North in evening	1	1
2nd	27·601	93	77	89	76	135	......	W	W.	......	......	Ditto Raining to South in evening	1	......
3rd	27·633	94	74	86	75	129	......	W.	W.	......	......	Ditto Hazy. Heavy storm to South in evening	......	......
4th	27·590	92	79	91	77	143	......	W.	N. W.	......	......	Hazy and Hot Ditto	......	1
5th	27·621	97	77	90	75	150	......	W.	N. W.	......	......	Ditto Cir and Cirrorni from South at night	......	......
6th	27·636	97	78	92	77	152	......	W.	N. W.	......	......	Ditto Heavy cir : storm to South and east at night	1	1
7th	27·665	97	84	86	76	154	......	W.	S. W.	......	......	Ditto West wind by day, South by night	1	1
8th	27·648	98	89	89	79	161	......	W.	S. E.	......	......	Over cast east wind with rain overcome by west	......	......
9th	27·554	97	77	89	78	157	......	S. W.	S. W.	......	·07	Hot close day. Heavy cir : to east with lightning to north east in evening	......	......
10th	27·516	97	67	87	77	152	S. W.	S. W.	S. W.	S.	·08	Over cast. Thunder and lightning to North	......	......
11th	27·566	90	67	77	75	144	W.	S. W.	S. W.	S. W.	·68	Ditto Thunder Storm, Lightning and rain at 1 A. M., and again at 5 A. M.	......	......
12th	27·591	89	75	80	76	153	S.	S. W.	N. E.	S. E.	......	Ditto Threatning rain	......	......
13th	27·567	91	75	80	76	153	S. W.	S. W.	E.	S. W.	·42	Ditto Thunder and Lightning and rain in afternoon	......	......
14th	27·567	88	74	80	76	152	S. E.	S. E.	N. E.	E.	·13	Ditto Threatening rain	......	......
15th	27·543	88	74	80	77	150	E.	N. E.	E.	S. E.	·31	Ditto Occasional showers	......	......
16th	27·548	90	76	82	79	154	S. E.	N.	E.	S. E.	·18	Ditto Thunder and lightning all evening	......	......
17th	27·565	89	75	78	76	145	S.	N. W.	E.	S. E.	3·13	Ditto Ditto very heavy in afternoon	7	6
18th	27·571	88	71	75	76	149	S. E.	S. E.	S.	S.	......	Ditto Lighting to North in evening	......	......
19th	27·580	90	76	81	75	150	S.	E.	W.	S.	......	Ditto Ditto	......	......
20th	27·505	90	75	78	75	150	N. W.	W.	N.	N.	·26	Ditto Ditto to South in evening	......	......
21st	27·518	85	74	78	75	149	S. E.	N. E.	N. E.	N. E.	1·42	Ditto Thunder Storm in afternoon	......	......
22nd	27·527	86	74	79	76	149	E.	N. E.	N. E.	E.	·16	Ditto Rain threatening in evening	......	......
23rd	27·526	87	74	78	76	149	N. E.	S. W.	S.	S.	·12	Ditto Heavy storm on North Horizon	2	3
24th	27·595	86	73	76	75	136	S.	S.	W.	S.	·30	Ditto Ditto on South-East with Lightning	1	......
25th	27·586	87	75	77	76	140	S.	S.	N. W.	W.	1·91	Ditto Thunder storm from east in evening	......	1
26th	27·549	87	74	78	76	145	W.	W.	N. E.	S. E.	·25	Ditto Ditto	......	......
27th	27·533	88	75	79	76	143	S. E.	E.	E.	E.	.02	Ditto Heavy storm to North East drizzling	......	......
28th	27·552	87	73	76	77	149	E.	E.	E.	E.	.33	Drizzling all day	......	......
29th	27·604	84	72	76	74	139	E.	N. E.	E.	E.	·14	Fresh breeze. Heavy scud, occassional drizzling...	2	3
30th	27·606	83	72	75	74	139	E.	E.	S. E.	S. E.	·30	Ditto Ditto	......	......
31st	Not taken	87	73	79	76	147	S. E.	S.	S.	S.	·05	Cool and pleasant. Earth-quake at 11-45 A. M.	2	
												Total ...	18	17

The following is the reported rain-fall at the different Stations of Bengal:

Howrah, 103·2 inches.

Jessore, 81·59 inches (up to the end of September.) Rainfall in 1867—81·14.

Kishnagur, 76·4 inches.

Furreedpore, 62·5 inches.

Burrisaul, 128·8 inches.

Mymensing, 97·67 inches.

Tipperah, average for five years=100·63.

Kooshteah, 152·3 inches.

Pubna, 97·15 inches.

Rampore Beaulcah, 57·17 inches.

Berhampore, 62·1, average for eleven years=54·16.

Maldah, 44·55 against 51·66 in 1867.

Julpigoree, 105·0 in 1867=108·5.

Darjeeling, 129·36.

Burdwan, 75·7.

Cutwa, 44·58 (from June to October.)

Bancoorah, 61·25 inches.

Raneegunge, 59·39 inches.

Soory, Beerbhoom, 55·80 inches.

Rajmehal, 537· inches.

Deoghur, 39·64, against 102·72 in 1867.

Pooroolia, 43·2 inches.

Chyebassa, 62·11 inches.

Hazareebagh, 50·15 inches.

Bhaugulpore, 49·25 inches.

Monghyr, 43·85 inches.

Purneah, 74·80 inches.

Gya, 27·41, average from 32 to 35 inches (proverbially low) in 1867=61·08 (very uncommon.)

Patna, 25·74 inches.

Tirhoot, 26·00 inches.

Midnapore, 71·95 inches.

Pooree, 54·3 inches.

In the case of the Stations not noted, no record was received.

Regarding the water-supply of the Towns and Villages of Bengal.

The subject of village water-supply has never as yet been systematically taken up by scientific men in this country. The Analytical Commission of

Bengal has hitherto had its attention chiefly directed to towns and military cantonments. There can be no doubt of the excessive impurity of water-supply generally in Bengal. The accompanying reports of Civil Surgeons reiterate the same story of poisonous and culpable defilement of water. The legislature has frequently dealt with the subject, and it has provided, as far as lies in its power, against existing abuses. Addressing the Government, I recently desired to be furnished with copies of all regulations and enactments relating to the construction of tanks and the prevention of the pollution of sources of water-supply. The following list of the Acts referred to was collated by the Superintendent and Remembrancer of Legal Affairs:

1. Regulation XXXIII., 1793.—A Regulation for repairing the embankments kept in repair at the public expense, and for encouraging the digging of tanks or reservoirs and water courses, and making embankments. The Sections 2 to 7 of the above regulation were rescinded by Regulation VI., 1806, which was again modified by Regulation XL., 1829. Both being finally repealed by Act XXXII., 1855, an Act relating to embankments.

2. Act XXVI., 1850 repealed Act X. 1842, which had been passed for enabling the inhabitants of any place of public resort or residence under the presidency of Fort William, not within the town of Calcutta, to make better provisions for purposes connected with the public health and convenience. The second Section of Act XXVI., 1850, referred amongst others to the provisions for making, repairing and cleaning drains or tanks, with reference to this Act XXVI., 1850, see Section V., Act III., 1864, (B. C.)

Act XII., 1866, to provide for the compulsory taking of rights to form and maintain private water courses for public works of irrigation. This Act applies to the North-Western Provinces and the Punjab, but may be extended to any other part of British India, Section 19.

Calcutta.

Sections 179, 180, 181, 182, 183, 184, 185, 186, 187, of Act VI., 1863; the Calcutta Municipal Act contain provisions regarding tanks, reservoirs, wells, aqueducts, &c., &c., and against the prevention and pollution of the sources of water supply in the town of Calcutta. There are similar provisions in Sections 70, 74 of Act III., 1864, the district municipal improvement Act, which applies to towns and places under the control of the Lieutenant-Governor of Bengal.

Howrah.

Act XXI., 1857, Sections 39, 40, 41, 42, refer to drains and tanks in that place, but in connection with this Act, see Section 5, Act III, 1864 (B. C.)

In spite of numerous enactments, however, the fact is indisputable that the majority of the sources of water-supply in Bengal are foul and filthy beyond all description. In many thousand of instances the water of wells is unfit for human consumption, being loaded with chlorides, nitrites ammonia and decomposing organic matter; in other words it is continually subject to sewage pollution, and daily tainted by animal and vegetable impurities of a dangerous character. The Chemical Examiner to Government, dealing with this subject writes:—

"In other places, though the water in the wells may naturally be very good, the soil being of such a nature as to yield a minimum of solid matter to the water percolating it, yet the supply may *become polluted by the neighbourhood of latrines, urinals, collections of filth, or animal or vegetable refuse,* or, perhaps, to a less degree, by the proximity of cook-rooms, wash-houses, and other buildings. Another source of danger of the same kind, and one very common to this country, is the proximity to the well of a dirty tank, such as is probably used for washing clothes, and bathing animals of all kinds, including man,——sometimes the most dangerously dirty of all; the water in the tank becomes in the hot weather *very low, and horribly foul,* yet so long as it holds water it will aid in feeding the supply of the neighbouring well."

"The causes of contamination that I have mentioned are those to which wells in all countries are, to a greater or less extent, subject; but the peculiar habits of orientals give rise to sources of contamination which do not exist in European countries. Thus when a native comes to a well, he does so to wash as well as to drink, and probably the first thing he does, will be to sit on the edge of the well with his legs dangling into it, draw some water with his *lotah,* or, if he is poor, with any old tin-pot improvised for the occasion, wash his mouth, face, hands and legs, and after this, having taken a drink, he goes about his business, unless it strikes him that his cloth is unusually dirty, when he will wash that too, and even if all this is not done over the well, it is done by its side, and the washings find their way, but by an indirect route, back to the well. Then to some of the wells, cattle are brought to be watered, and with them come their attendants, dirty to a degree, and just having issued from a foul stable, or more filthy hut which they may be occupying with a cholera-stricken companion. Where they have been sitting, a friend or the Bheestee throws down his pot or his water-bags, or rests his *mussuck,* and dirt which adheres to these implements in all probability goes down into the well. Or it may be the Bheestees or the servants, fresh from traversing with their naked feet the cholera ward of a hospital, stand upon the edge of the well, or on the wooden platform over it, and as they draw the water, the droppings wash the dirt from their feet into the well beneath."

On the same subject, another chemical analyst writes as follows:—

"Another source of contamination, and possibly the worst of all, because ever at work, exists in the habits of the natives themselves. They visit a well for all purposes indiscriminately, and under all conditions indifferently. They will bathe their persons and wash their clothes, and finish up by drinking the water which only a few minutes before they were engaged in polluting. They will also visit it under all and every condition of life. Well or sick, clean or dirty, with gonorrhœa, syphilis, purulent ophthalmia, leprosy, scabies, fever, dysentery, diarrhœa, cholera, and small-pox, and many and every other form of disease, provided only they are able to crawl thither." (Dr. Orton's report on the water-supply of Lucknow.)

Dr. Moore, in his "inquiry into the truth of the opinions regarding Malaria," thus dsecribes the pollution of village wells and tanks:—

"But, however impure the water may have been in European countries, it can scarcely, even at the worst, have attained to the minimum condition of defilement prevalent in India. I write more particularly of the *moffussil.* Here, wells are almost invariably open, and frequently the only water obtainable is from the village pond. Leaves of trees, dust, dirt of every description and frequently both dead and living insects and reptiles, may be seen floating on the surface. And as a climax, village tank-water is defiled by the solid and fluid *excreta* of the hundreds of buffaloes and kine, which twice a day are brought to drink; and also by the ablutions, and not unfrequently by the *excreta* of the villagers themselves! I have, indeed, many times seen the latter fill their water pots within six feet from a micturating buffalo!"

Baboo Kanie Lall Dey, writing "on Hindu social laws and habits viewed in relation to health," thus refers to the habitual pollution of house-hold tanks: " To a native house, contiguous to the female apartments, is generally attached a tank-in which the women perform their ablutions, wash their cooking utensils, and the water of which they use for culinary and domestic purposes. It is, however, nothing better than a kind of mill-pond into which every kind of refuse is thrown or is allowed to discharge itself, the putrid matter thus collected not being cleared out once for a long series of years, no one dreaming of any harm from it. And yet the noxious air diffused by these means tends to the most fatal effects."

I have preferred adducing the independent evidence of qualified chemists regarding the water pollution of Bengal to stating my personal experiences on the subject. The reports of Civil Surgeons fully corroborate all the loathsome details of the statements above quoted. In proof of this I might refer more particularly to the reports from Dacca, Pooree, Beerbhoom and Noakholly. It may be accepted as a truth that, in Bengal villages, there is almost universal pollution of water supply. *I regard this as the most important sanitary question concerning India.*

The facts being as above described, I will allude to what the experience of mankind has taught regarding the significance of such water-pollution; and I will then state what remedial measures ought, in my opinion, to be adopted. England had at one time almost as polluted and as uncared for a water supply as Bengal has now. What was the consequence, as concerns the four reigning diseases of India: fever, cholera, diarrhœa and dysentery? I will endeavour to answer this question by the recorded statements of high sanitary authorities.

The preventability of fevers is strongly believed in by many competent authorities. Dr. Baudens, the head of the French medical department in the Crimea, went the length of asserting that "fever is an artificial disease, and may be produced or destroyed at will." Such a *dictum,* if it be true of continued fevers, is more particularly so in the case of intermittents which, by sanitary works, have been all but banished from Great Britain. The intimate connection between bad water supply and agues has been clearly shown by Drs. Bettington, Moore, and many other physicians in India.

The highest sanitary authority in great Britain (Mr. Simon), writing ten years ago on the hygienic condition of the people of England, arrived at the conclusion that it was practically certain that "in the districts which suffer high diarrhœal death-rates, the population either breathes or drinks a large amount of putrefying animal refuse." "In 1854 that part of the population of London which was known to be drinking foul water suffered 57 *per cent* more diarrhœal mortality than the population drinking other water." Again, the cholera mortality amongst drinkers of fœcalized water "was more than three-fold that which occurred amongst the drinkers of clean water." All recent evidence in India, as in England, goes to prove that water tainted with the products of fermenting *excreta* is in close relationship with the immediate causation of cholera, if indeed it be not its very source. The late Dr. Snow believed that the bad health of the inhabitants of English towns depended "solely on the depraved quality of the water drunk." If such be even an approximation to truth, which I am afraid is only too probable, the diseases of India ought to be essentially preventible and this, to a very great degree I believe to be the case. It has been shown above how manifold and how loathsome are the defilements of water-supply in India. The people systematically foul water, in the most disgusting manner, which they and their neighbours have to drink. The contents of necessaries and neglected cess-pools soak into wells and trickle into tanks; the surface washings of filthy localities have a similar destination; putrefying refuse from slaughter houses and filterings from graves also leak into already tainted wells; the water in which the bodies of men and animals have been washed is drunk without hesitation. There is positively no limit to the indifference evinced by the lower classes of the people of Bengal in this matter. " One of the most common forms of prayer," writes Baboo Kanny Loll Dey, " as muttered by the Brahmins while bathing in the river is: " O Gunga ! thou art the door of heaven; thou art the watery image of religion ; thou art the garland round the head of Shiva ; the craw-fish in thee is happy, while a king at a distance from thee is miserable."

" Pure or impure" continues the same candid writer, " clean or muddy, stinking or odoriferous, its water, say the Shastras, may be drunk with everlasting benefit to the human soul." If a man find filth mixed with water drawn from the holy stream, he has only " to separate the filth from the water, and drink the latter with a light and gladsome heart." So the simple people of Bengal drink faithfully, and see in the watery image of their religion no impurity whatever. Let a decomposing corpse be staked close to the Ghât, as commonly happens in certain localities, yet will the bathers drink as usual, without a sign of repugnance. And then again, in the heart of villages, I have myself seen the people making use of putrid water which I should have been sorry to see, the most unclean animals drink. We have no mere suspicion of such things ; they are everywhere and at all times visible ; and so long as this obtains, so long must fevers, diarrhœa, dysentery and cholera be household words. A well known maxim in philosophy lays down that " superfluous causes ought not to be assumed ." Here then, in almost universal water-pollution, we see the origin of a vast amount of prevailing sickness and death in Bengal. There can, I think, be no doubt that such water-defilement should be prevented to the utmost. To carry this out effectually would, I am aware, be a most difficult task—perhaps altogether impossible. Yet it is very certain that much good might be done in this direction. As a matter of fact existing enactments on the subject are not enforced. Any man, by unclean habits, may poison the water supply of his neighbour without fear of rebuke or punishment. Offenders in this respect have not been brought to a sense of the great wrong they are committing. Water conservancy it would appear concerns nobody. I am of opinion that, at the expense of every village and town in Bengal, a good and abundant supply of water should systematically be furnished to the people, by the Government. In out-lying places, Zemindars and heads of villages should be held strictly responsible that well and tank water within their jurisdiction is not wantonly defiled. In large towns this should be the business of a special Government establishment. When the responsible parties fail in carrying out necessary works of purification, these should be thoroughly accomplished under the orders of the Government, and the cost raised by assessment from those immediately benefitted. Sub-divisional Officers should be required to enforce, most strictly, the necessary regulations as to the cleanliness of tanks and wells, and as to the keeping specially apart some for bathing purposes and others for drinking supply. Every well or tank should be cleaned at least once a year; and no excuse should be accepted for non-obedience to this rule. If this be imperatively insisted on, I do not hesitate to say that the gain to public health will ere long be very conspicuous. If on the other hand it be neglected as heretofore, we must simply continue to see the population of this country thinned, weakened, and destroyed by influences which are quite within human control. A *fiat* from the Government, and attention to the same on the part of District Officers, is all that is required. The people would thus be infinitely benefitted, and within a few years they would come to know and confess it. The *inertia* of human nature is opposed to all sanitary reform, as it is to everything else that is troublesome. The nature of the Bengali in such matters is especially apathetic. It cannot, without great danger to public health, be left undisturbed. It is in my opinion the part of the Government to require the adoption of all measures which, in an unqualified manner, tend to the physical well-being of large populations. Such a measure is the guarding of water from wilful pollution. The time will doubtless come when the storage of water will be more scientifically conducted than at present obtains in India. All wells and tanks should be covered; and it would propably be advantageous to have the latter raised above the surrounding level, instead of being sunk, so that percolation should be away from them instead of into them as is now the case. Dr. F. Macnamara, the Chemical Examiner to Government, has in his last report on the analysis of the potable waters of Cantonments in the Bengal Presidency, made a suggestion which appears really practical and useful. It is that by sinking a well within two or three yards of the edge of any tank, the water obtained from the well fed by percolation from the tank, will as a rule be much purer than the tank-water itself, the intervening soil acting the part of a natural filter. It is recommended that the well should be a *kutcha* one, lined with earthen-ware rings, and having a proper masonry ridge, platform and drain; it should also have a shed-covering, open at the sides. This proposal by Dr. Macnamara, which has been carried out with most satisfactory results between the tanks on the *glacis* of Fort William, appears well worthy of more general adoption.

A good deal has of late been written regarding the use of Norton's tube wells in India, as likely to afford a facile means of obtaining un-contaminated water. They have been tried, so far as I know, only on two or three occasions in Bengal, once at Calcutta and twice at Hooghly. The trials referred to did not yield satisfactory results. The tubes were choked with sand and silt, which rose to within a few feet of the pump valves. At Hooghly a small quantity of water was pumped up from a depth of 17 feet; but on sinking the tube, to its extreme length of 26½ feet, the lower end of it became closely packed with fine white sand, through which no water could be drawn. Messrs. Colvin Cowie and Co., the Agents in India for the holder of the patent, judging from the results described above, are of opinion that the utility of the well cannot be fairly tested at the localities where heretofore it has been tried until patent sand-tubes are received from England. It therefore remains to be proved whether the apparatus referred to can be usefully applied for the purpose of tapping and giving egress to water which is to be found within twenty-six feet of the surface. Again, with regard to the purity of such a supply, if it be intended to serve for drinking purposes, it is important to bear in mind that the water so obtained is simply surface water which has percolated through the soil, and that it is not the discharge of "a natural spring."

REGISTRATION OF MARRIAGES AND DEATHS.

A register of marriages and deaths *amongst Native Christians* was kept at the Baptist mission house, Monghyr (by J. Lawrence, Esq., Baptist Missionary.) The Native Christian community, however, was very small; during the last ten years it varied from sixty to eighty, including children; eight marriages were registered from 1st January 1863 to 30th June 1868; and twenty deaths from January 1857 to 30th April 1868.

Somewhat more extended Statistics were kept at two Bengali agricultural villages,—Kapasdanga and Chupra in Nuddea. Those from Kapasdanga were compiled from Registers kept by the resident European Missionary, the Reverend F. Schurr. Similar records were also kept and compiled by the Reverend C. H. Blumhardt at the Sudder Station of Kishnagur. These Statistics are here submitted, the forms being careful and the facts reliable.

Christians at Kapasdanga in Nuddea.

1	2	3	BIRTHS.			DEATHS AT EACH AGE.											CAUSES OF DEATH OR DEATHS FROM.					
			4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	Ascertained population.	Marriages.	Male.	Female.	Total.	Under 1 year.	1 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 and above.	Total.	Fever & Spleen.	Cholera.	Dysentery.	Small-pox.	Other causes.	Not known.
1850 ...	395	9	13	21	34	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1 ...	...	2	9	15	24	4	5	...	...	3	1	...	...	1	...	14	...	2	...	...	2	10
2 ...	...	4	11	16	27	3	...	...	1	...	...	1	2	...	...	7	...	1	...	...	2	4
3 ...	471	10	13	14	27	1	5	1	1	4	...	2	...	1	...	15	...	8	...	...	4	3
4 ...	507	14	8	13	21	...	8	...	...	1	...	...	1	1	2	13	5	...	...	...	5	3
5 ...	...	17	13	9	22	5	8	1	...	...	2	...	3	..	...	10	1	...	...	...	4	14
6 ...	500	2	11	16	27	2	25	7	5	4	4	...	3	2	...	52	6	32	4	...	10	...
7 ...	...	10	10	14	24	3	9	2	...	5	1	1	...	...	...	21	4	1	2	5	9	...
8 ...	...	9	12	13	25	1	5	1	..	1	1	3	...	...	1	13	2	5	...	3	3	..
9 ...	...	5	13	18	31	...	1	1	...	1	...	...	...	1	...	4	2	...	...	...	2	...
1860 ...	...	7	13	10	23	1	2	1	...	...	..	...	1	1	...	6	4	1	...	...	1	..
1 ...	...	6	9	17	26	...	2	...	...	...	...	1	1	1	...	5	3	...	...	1	1	...
2 ...	...	9	7	10	17	...	5	1	...	...	3	1	1	...	...	11	2	7	...	...	2	...
3 ...	529	9	10	5	15	...	1	...	1	...	...	...	2	...	1	5	2	2	...	...	1	...
4 ...	...	10	14	10	24	5	12	4	2	1	1	2	...	...	3	30	14	...	4	...	12	..
5 ...	...	6	19	11	30	3	19	7	2	5	3	4	2	...	...	45	10	25	...	...	10	...
6 ...	...	10	13	5	18	6	6	3	...	2	8	2	1	...	...	23	11	...	...	3	9	...
7 ...	419	6	8	12	20	3	8	3	1	3	1	1	...	...	...	20	8	...	..	...	12	.
8 ...	To 16th May inclusive.					...	5	2	1	2	1	...	...	...	...	11	4	6	...	...	1	...
Total ...	...	145	206	229	435	37	126	34	14	32	21	18	17	8	7	314	78	90	10	12	90	34

Christians at Chupra, about ten miles west of Kapasdanga.

1	2	3	BIRTHS.			DEATHS AT EACH AGE.											DISEASE CAUSING DEATH.					
			4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	Ascertained population.	Marriages.	Male.	Female.	Total.	Under 1 year.	1 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 and above.	Total.	Fever and Spleen.	Cholera.	Dysentery.	Small-pox.	Other causes.	Not recorded.
1850 ...	...	...	3	9	12	1	1	1	...	2	3	1	...	1	..	10	...	...	...	...	...	...
1 ...	...	...	5	13	18	1	1	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...
2 ...	...	...	11	12	23	2	1	...	...	...	...	...	...	1	...	4	...	...	...	...	...	...
3 ...	...	...	13	16	29	1	3	2	2	1	...	...	3	...	...	12	...	...	...	...	...	...
4 ...	...	...	14	9	23	...	...	...	...	...	...	1	...	2	2	5	...	...	...	...	...	..
5 ...	...	...	21	16	37	1	...	1	...	...	1	...	...	1	...	4	...	...	...	...	...	...
6 ...	...	...	12	14	26	2	3	...	...	...	...	...	...	...	...	5	...	...	...	...	...	...
7 ...	...	...	14	13	27	8	27	2	6	4	4	...	...	2	4	57	Small-pox and cholera raged.					
8 ...	...	...	12	21	33	...	9	1	1	3	...	...	...	2	...	16	...	...	...	...	...	...
9 ...	...	...	9	10	19	2	...	...	...	...	...	...	1	...	...	3	...	...	...	...	...	...
1860 ...	...	...	12	6	18	2	1	3	...	...	1	3	...	...	...	10	...	...	...	...	...	...
1 ...	...	3	12	10	22	...	1	...	1	...	2	2	3	...	1	10	...	...	...	...	...	...
2 ...	...	11	12	10	22	1	19	2	1	2	1	2	1	1	...	21	...	...	...	...	...	..
3 ...	...	7	7	11	18	...	3	1	...	...	...	...	5	...	...	9	...	...	...	...	...	...
4 ...	...	4	8	7	15	...	10	1	2	2	1	...	1	...	...	17	...	...	...	...	...	...
5 ...	...	5	7	6	13	...	2	1	...	...	1	...	...	...	...	4	...	...	...	...	...	...
6 ...	...	3	3	5	8	1	2	...	1	...	1	...	...	...	...	5	...	...	...	...	...	...
7 ...	682	3	7	8	15	...	1	...	...	..	1	...	...	...	1	3	...	...	...	...	...	...
8 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	...	182	196	378	22	75	15	14	14	16	9	14	10	8	197	...	...	...	...	...	...

Christians at the Sudder Station of Kishnaghur, Nuddea.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
			BIRTHS.			DEATHS AT EACH AGE.											CAUSES OF DEATH.					
	Ascertained population.	Marriages.	Male.	Female.	Total.	Under one year.	1 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	80 and above.	Total.	Fever and spleen.	Cholera.	Dysentery.	Small-pox.	Other causes.	Not known.
1850	360	4	15	10	25	3	3	...	1	1	...	...	...	...	...	8	...	...	...	...		
1851	350	6	6	6	12	1	1	...	...	1	...	1	...	...	...	4	...	...	...	...		
1852	420	8	8	4	12	1	3	...	1	...	...	...	...	1	...	6	...	...	...	...		
1853	470	5	34	20	54*	1	2	4	1	...	...	3	...	...	2	13	...	...	...	...		
1854	440	9	13	13	26	...	2	2	1	2	...	...	...	...	...	7	...	...	...	...		
1855	460	1	2	1	3	...	1	...	...	2	...	...	...	1	...	4	...	...	...	...		
1856	390	2	12	5	17	...	3	1	...	2	1	...	...	...	...	7	...	...	...	...		
1857	332	4	4	7	11	...	2	...	...	2	3	...	...	...	...	7	...	...	...	...		
1858	341	1	6	7	13	...	2	...	1	...	...	...	...	...	...	3	...	...	...	...		
1859	319	5	10	8	18	2	3	...	2	2	...	...	1	...	...	10	...	...	...	...		
1860	308	5	6	7	13	...	2	2	1	...	...	2	1	...	...	8	...	...	...	...		
1861	314	1	11	2	13	...	1	2	2	2	...	1	1	...	...	9	1	...	...	1	One from snake-bite.	
1862	306	2	12	10	22	2	5	14	...	...	...	1	1	...	...	13	...	...	...	...		
1863	325	1	4	4	8	4	1	...	2	...	1	1	2	...	...	11	...	...	...	...		
1864	309	4	4	6	10	3	...	1	1	1	..	...	1	...	...	7	...	...	...	...		
1865	311	2	6	5	11	...	4	2	...	...	...	...	...	...	1	7	...	...	...	...		
1866	312	2	6	5	11	2	1	6	1	1	1	1	2	...	...	15	9	1	1	...	One of Dropsy.	
1867	339	2	7	4	11	...	2	...	1	1	...	2	...	...	...	6	2	...	...	...	One of Asthma.	
1868 up to the middle of September ...	330	3	2	8	10	...	1	...	1	...	...	1	...	...	...	3	2	...	...	...		
Total ...	......	67	168	132	300	19	38	24	16	17	6	13	9	2	3	146	14	1	1	1	3	126

* Here it is to be remarked that not all the 54 children were born in that year. The number is taken from the Register of Baptism of children, but some of them were already 2, 3, or 4 years old when they were baptized, the parents having been careless to bring their children to be baptized.

(Sd.) C. H. BLUMHARDT.

These Statistics are on a very small scale certainly, but they tell their own instructive tale, inasmuch as they are positively, so far as they go, amongst the best we can at present boast of in Bengal ! From such small beginnings it is certain a good and wide system of reliable registration will spring up. At present, in this respect, I fear we have nothing but what is highly unsatisfactory. No good can come of blinking this unfortunate fact. I have in Part I. of this report, and in Appendix F. alluded to the subject of Statistical Registration. The returns now received from the different districts are crude and incorrect to the last degree ; they are wanting in uniformity, method and precision ; to such a degree is this the case that they may be said to be utterly valueless. The most absurd entries are found in all these Returns : widows are said to die at the age of two years ; males die "puerperal" ; old women die of hydrocele ; and such causes of death as the following are commonly met with : sickness of the eye, a certain pain, phlegm, pain in ear, big sore, itch, boil, woman's disease, gastrodynia, vomit, inflammation of rumen, panic, vapours, by ghost ! &c., &c.

It is truly not in this way that we can ever expect to ascertain the hygienic condition of a people, or to gain a knowledge of the amount of prevailing disease and the real causes of mortality.

It is only with "faithful and unerring returns of marriages and deaths" that the Registrar-General of England is said to be able "to measure the robustness of national vigor, or to probe the depth of national sufferings."

Incidence of population.—The incidence of population to the square mile is reported as given below, at the following places :—(I am afraid, however, these reports are but little to be relied on, the population of England and Wales to the square mile is 344·06 ; of Great Britain 259·8 ; of Belgium 389 to 400 ; of Benares, the most densely peopled place in the North-Western Provinces, according to the Census of January 1865, 797) :

Howrah	1025
Hooghly	1100
Jessore	376
Mymensing	185·3
Noacolly	1817
Tipperah	264·6
Pubna	225
Rajshahye	253·3
Maldah	184·3
Rungpore	285·7
Julpigoree	140

Beerbhoom	314·
Gya	274
Chumparun	266
Pooroolia	125·1
Chyebassa	71·99
Midnapore	400
Pooree	232

Emigration.—From the reports of the Protector of Emigrants and the Government Medical Inspector, I take the following information as to the Emigration of Indian laborers to the Colonies:—

The total number of Emigrants including women and children, dispatched under Act XIII of 1864, during the year 1868-69 was 10,274 (against 5,154 in the previous year); 1,237 went to the Mauritius; 5,014 to British Guiana; 2,248 to Trinidad; 1,426 to Jamaica; and 349 to St. Vincent.

"The Death-rate amongst return emigrants was 1·86 per cent from Mauritius and 2 per cent. from St. Croix. Act VI of 1869 has increased the space to be allotted to each emigrant on boardship, which was recommended both by the Protector and Medical Inspector."

10,274 emigrants sailed in twenty-six ships.

Dr. Partridge reports as follows on the sickness and mortality of the year:

"The sanitary condition of the depôts has been carefully attended to throughout, and, on the whole, the result has been satisfactory. Three hundred and fifty-four individuals were admitted into the St. Vincent's depôt during the season, and of these two died: into the Mauritius depôt there were 1,529 admissions and the deaths were twelve; the admissions into the Jamaica depôt were 1,539 and the deaths fifteen; in the Trinidad depôt the admissions were 2,551, and the deaths twenty-seven; and in the British Guiana depôt the admissions were 6,403, and the deaths seventy-four.

In August 1868 Cholera raged fiercely throughout the greater part of Garden Reach; at this time fortunately the emigration depôts escaped the visitation, but later on the disease made its appearance and gave rise to very considerable mortality; thanks, however, to the sanitary precautions adopted, and in spite of the crowded state of the depôts, the disease never assumed anything like epidemic proportions. In the British Guiana depôt there were twelve cases of cholera in September and eight deaths; twenty-one cases in October and sixteen deaths; nine cases in November and six deaths; one case in December and one death; and twenty-one cases in January and thirteen deaths; in the Trinidad Depôt there was one case in October, which recovered; five admissions in November and two deaths; one in December and two deaths; and six in March with three deaths. With the exception of cholera there has been very little sickness during the year, and I therefore consider myself justified in looking upon the result of the season's operations as, on the whole, satisfactory."

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*The following is an abstract of the mortality and sickness in the Bengal Jails for the year under review.**

The average number of daily sick in the Jails of Bengal during 1868 showed a *decrease* of 32·43 *per diem* as compared with 1867.

The *total* sickness was less in 1868 by 2605.

The ratios of sickness to daily average population was 8 *per cent* less than in 1867.

Diarrhœa, fever and cholera were less prevalent than during the previous year.

The death rate of the year was 5·05 per cent, against 5·88 in 1867, showing a decrease of ·83 per cent. In no year during quarter of a century was the death rate lower than in 1868; and the rate for this year is more than ⅓ lower than the average for the quarter century. The saving of life was 31·40 per 1000.

During 1868 there was an *increase* of mortality in 23 jails; a *decrease* in 32 of them.

The percentage of sickness to the daily average jail population in the year ranged from 17 at Godda to 460 at Dinagepore.

The percentage of mortality to the daily average population ranged from 1·23 at Tipperah, to 15·43 at Rungpore.

In 15 jails there was an *increase* of mortality from cholera as compared with 1867; in 40 Jails there was a *decrement* of mortality from this cause.

36 Jails were altogether free from cholera in 1868. The greatest amount of sickness—14 *per cent to mean population in Jail,* occurred in December; the lowest was 9 *per cent* in September and October. The largest number of casualties, 112, occurred in April, and the lowest, 59, in June and July.

Cholera proved most fatal in April.

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* Note. The facts were compiled from the last Report of the Inspector-General of Jails, Lower Provinces.
D. B. S.

The comparative mortality in the jails of different Geographical areas is thus laid down by Dr. F. J. Mouat, the Inspector General:

	Mortality per cent on daily average.
1.—Orissa	2·59
2.—Sonthalia	2·72
3.—Assam and Cachar	4·03
4.—Behar	4·57
5.—Bengal Proper..	5·37
6.—East Gangetic..	7·15

THE FEVERS OF BENGAL.

Much has been written, of late years, regarding the different kinds of fever prevailing in India. Some believe that the type of the malady which prevailed, since 1860, in the jails of Northern India is identical with the contagious fever of emigrant ships, and with the so-called epidemic fever of Lower Bengal. Herein, as it seems to me, lies a very grave error. The fever of the Bengal districts is, beyond all doubt, an endemic malarious disease, due to local causes—chiefly want of drainage, partial or complete stagnation of water-causes, and saturation of the soil with moisture. It is not contagious. Its remissions and exacerbations are more or less regular diurnally. It is not characterized by a specific crisis or relapse. It is a typical malarious endemic fever. The fever of the jails of Upper India was something very different; it was a critical, *relapsing fever,* and highly contagious. It was the genuine "relapsing fever" of Ireland,—*la fièvre recurrente* of the French,—*not* typhus, nor typhoid, properly so called, nor yellow fever, nor malarious remittent; but a fever specific in its nature, dependent more or less directly on conditions generated by want and privation. For long it was believed, by the highest authorities, that this disease did not appear in India. There can now however be but little doubt on the subject. In three papers, contributed to the *Indian Medical Gazette,* in May 1867, and February and March 1868, I discussed this subject at length. It is one of great medical importance. During the last two years I have thought over it anxiously and have had ample opportunities of studying the fever of Lower Bengal. Extended observation has only tended strongly to confirm the views which I published more than two years ago. The fever which has proved so fatal in the districts adjoining the Presidency is altogether distinct and different from the jail fever of the Upper Provinces. The study of masses of recorded facts proves this beyond dispute.

What the *emigrant* or *ship fever* is, I do not pretend to determine with accuracy. Dr. Partridge, who studied the matter very closely, believed it to be *typhus,* and an eruption accompanied it, which he was inclined to think was mistaken for that of measles. This is possible; or again it may have been relapsing fever; distinct relapses were alluded to (*vide* Proceedings of the Sanitary Commission for Bengal, 28th February 1866, paras. 23 to 25.) "The unfortunate patient scarcely acknowledged that he was at all unwell, and had a good appetite till the last," (para. 109.) It was a highly contagious disease. "The virulence of the epidemic" writes Dr. Partridge, "bore a very close relation to the degree of overcrowding." The available space superficially was reduced to 10·26 feet for each soul. Whatever the disease was which caused so great a mortality on board our emigrant ships between September 1864, and September 1865, it most certainly was not the ordinary malarious fever of India which has prevailed so virulently in the Districts of Hooghly, Kishnagur and Jessore."

The *Mauritius fever* seems to me to partake much more of the characters of the Bengal endemic. This impression is to a great degree borne out by the Memorandum published in the Proceedings of the Sanitary Commission with the Government of India for March and April 1869. The country where it has prevailed most severely is remarkable from the fact of its streams having either become greatly diminished or altogether dried up, the general drainage of the country having very imperfect; "so much so that it finds its way into the cellars of the houses." It was during the prevalence of severe drought that the malarial fever broke out. It spared the more elevated and mountainous spots. It was not propagated by contagion, nor could it be discovered that it had been imported into the island.

It is worthy of remark that the identical conditions which gave rise to the disease at Port Louis and elsewhere in the Mauritius now foster the disease in Lower Bengal: *viz.*, want of drainage, the reduction of rivers to a low level, the deposit of silt at the mouths of rivers and on marshy plains &c. Such causes are quite sufficient to account for all the sickness and mortality that has been reported. For a time they did not produce any marked effect. Cumulative action however began at last to tell. Nothing more was necessary. Silent and gradual influences culminated, and in the course of time a most virulent malarious disease sprang forth; not contagious, not calling for quarantine or disinfection, but for good drainage and an improved water supply. Such is the exact history of the fever of Lower Bengal which is widely different in its causation, symptomatology and pathology from the relapsing fever of jails in Upper India. I have dwelt on the distinctive characters of these various fevers, as much confusion seems still to prevail on the subject. Until the nature and causation of the maladies are clearly determined, it is almost vain to attempt their eradication. For the time being, relapsing fever has ceased to be epidemic, its essential conditions having subsided. But the fever of Lower Bengal is still silently slaying its thousands. Its causes have been pointed out and practical action is now being taken for their removal. Human effort will in time reduce its fatality.

It is to be remarked that from March to June 1868, relapsing fever was observed at Buxar and Karuntudhee by Dr. Hugh Clark. Notes of 17 cases were taken, and Dr. Clark has published an account of the disease in the Indian Annals of Medical Science, No. XXV for January 1869. The general characters of the disease are thus described; and it is scarcely necessary to say that they were esssentially different from those of ordinary malarious fever:

" Rigor or chill was followed by fever, there being a dry hot skin, a full, frequent pulse, the tongue coated with a fibrous or nodulated white or dirty fur, or, in bad cases, dry and rough; sometimes great thirst; constipation; often enlargement of the liver and spleen, and tenderness of the hypochondria and epigastrium; occasionally jaundice; hurried breathing; headache; sometimes pain in the back or the legs; occasionally delirium, passing, in fatal cases, into coma.

On or about the sixth day the febrile symptoms abruptly ceased; the crisis being marked by sweating, which might be very free. Convalescence followed for a week, during which the tongue became clean, the appetite returned, and the patient might be sitting up or even walking about. The pulse was full, but had less force, might be irregular, and was sometimes very slow. Dysentery, ophthalmia, or jaundice might now come on.

After a week's intermission, fever abruptly returned, with a repetition of the former symptoms, often preceded by rigor, and lasted for about four days, being again sharply cut short by a second crisis, with copious sweating followed by a slow convalescence."

Dr. Clark found the disease to be very contagious.

On the 9th of April 1868 I had an opportunity of seeing, in one of the Calcutta depôts, 31 emigrants (Hindootanees and Madrassees) who had just arrived from the Mauritius and most of whom were very sick. Several of them had enlarged spleen. They described their fever as distinctly intermittent; they said quinine benefitted them. They were suffering simply from a severe form of malarious fever.

Reputed action of Petroleum as a counter-active of Malaria.

It is here right to note the fact that a report was forwarded to the Government by Colonel H. Hopkinson, the Commissioner of Assam, in which he remarked that Dr. Berry White of Debrooghur had officially drawn his attention to the observation that imported coolies engaged as labourers at the Petroleum works of Makoom, near Jeypore, in upper Assam, seemed to enjoy an unusual immunity from Malarious influences.

Dr. White's report was the following:

8. "It may not be un-interesting to notice here the unusual good health and immunity from malarious influences enjoyed by the imported laborers at the petroleum works. I made an especial point of enquiry into this, in consequence of the extreme unhealthiness for which Makoom has been hitherto notorious. When there was a detachment of my Regiment stationed there the mortality was never under twenty per cent. *per annum* among the sepoys; chiefly in consequence of this, on representation to Government, the post was taken over by the Police about four years ago; since they have occupied it, it was found to be no less deadly to the Bengalis and Hindustanis of that force, and for the last two years on my advice Captain Hume has only sent to the place men who were either Donaneers or Cacharies, both races who are known to thrive rather than otherwise in malarious localities; as these Bengali laborers could not possibly be so well cared for as the sepoys, I expected to find that the mortality among them would have been something appalling. I was equally surprised and gratified to find that it was all but *nil*, only one death having occurred in two years out of a population of over sixty persons, and that one was an old debilitated woman who was allowed to accompany her friends. There was an increase by births of seven, and as many more expected within a short time. The infants born on the place all looked strong and healthy. This immunity from malarious diseases can, I consider, only be accounted for on the presumption that the gases, &c., given out by the petroleum, exercise a protective influence against the effects of jungle miasma, which is supported by the fact that this mineral oil contains carbolic acid or its elements now recognized as one of the most powerful and effective disinfectants known. I further noticed that the coolies were quite free from ulcers or sores on the extremities, which is one of the greatest afflictions of the imported laborer in Assam, and is very difficult to treat. In the tea plantations, leech bites or any scratch or cut in most cases causes an obstinate ulcerous sore. These laborers although they get cut and bitten frequently, their wounds invariably heal rapidly, and as their work necessitates their being up to their knees in oil for several hours daily, it is only reasonable to deduce that it is this that causes the cure.

9. I have noticed this to you not for its scientific interest, but because it may be looked on as one of very considerable political and economical importance to the future of the district. For if this speculation should turn

out successful, which it promises to do, it is satisfactory to know that it will not be attended with the fearful loss of life among immigrant laborers, which up to this has been incidental to every other branch of European enterprize in this Province."

Colonel Hopkinson, in commenting on the above, wrote as follows :

"I do not know whether up to the present time any discovery has been made in regard to the nature of malaria which would rival in importance the obtainment of proof that it could not exist in an atmosphere charged to some particular extent with the vapours of petroleum oil."

At the same time he noted the important fact that the imported coolies were Dhangurs, a race of beings who are proverbially proof against malarious poisoning.

On the subject of Dr. White's communication, I made a reference to Mr. C. H. Bailey, the American Vice-Consul General in Calcutta, begging the favor of his obtaining for me any available information from America on the subject under consideration. He kindly forwarded all the correspondence to the Government of the United States, and in reply I was informed that the matter had been referred to the Surgeon-General of the United States' Army. As yet no further communication has been received.

I also communicated with Dr. T. Oldham, the Head of the Geological Department of Bengal, on the same subject. Dr. Oldham was unable to find in American works, on Petroleum, any allusion to the Sanitary effects of its gases as an antidote to Malaria. He wrote to me as follows :—"I remember when visiting the Burmese wells at Zenankyoung, I asked whether there had been noticed any peculiar result traceable to the constant employment of the same persons at the oil wells, or in casting it into the river. But I could not find that the Natives had noticed anything either beneficial or injurious. They were satisfied it did no harm, that was all !"

Dr. Oldham, further remarked that in the Punjab the Natives regard Petroleum "as a panacea for all sore-backs, wounds, cuts and bruises on their camels." He also alludes to the virtues of the vapour of pine forests, and of "resin baths." Lastly, he adds the following useful remark : "It would be well to get some one near the Petroleum works to record for a time the ozonizing effects of their vapour."

I next communicated with the Government of British Burmah, begging that I might be favored with any information that could be collected on this interesting subject. Through the kindness of the Chief Commissioner, I received the following letters in reply, which I think it well to give *in extenso,* as it seems highly important that the question should be accurately determined whether Dr. White's observation can be corroborated or not.

I would merely add that I was lately informed by a gentleman who had been engaged on Petroleum works in *Wallachia,* that the Turkish laborers there do consider that the Petroleum has specific virtues against fevers ; and he further stated that, in this belief, they are in the habit of drinking the water diluted, which has been impregnated with the earth-oil.

The following are the communications received from Burmah on this subject:

FROM MAJOR H. NELSON DAVIES, Secretary to the Chief Commissiner of British Burmah, to DAVID B. SMITH ESQ., M. D. Sanitary Commissioner for Bengal, Barrackpore; dated Rangoon, 13th July 1869.

SIR,

With reference to your letters No. $\frac{5}{8}\frac{8}{2}$ dated 20th August and 3rd October 1868, on the subject of the immunity from malarious influences afforded by the gases evolved in the working of Petroleum, I have the honor to forward herewith copies of documents as per margin; that from Major Sladen containing information regarding the petroleum wells at Yeanangyoung."

1. From Sanitary Commissioner British Burmah, No. 64, dated 12th November 1868.
2. From Major Sladen Political Agent at Mandalay No. 50, dated 22nd May 1869.

To H. SPEARMAN, ESQUIRE, Assistant Secretary to the Chief Commissioner, No. 64; British Burmah, Rangoon, 12th November 1868.

SIR,

In acknowledging the receipt of your Home Department Proceeding No. $\frac{405}{4}$ dated 23rd October 1868, forwarding in original papers on the subject of the prophylactic properties of Petroleum, I have the honor to state as follows:

Every Burman uses earth-oil when he can get it, (and it is seldom that he cannot,) as the cheapest means of lighting his house at nights.

It is employed, as Colonel Hopkinson remarks, in cases of ringworm, and with success in the milder forms of that skin disease; for simple local muscular rheumatism with great benefit, and for skin diseases generally among dogs and cattle. Earth oil is a certain cure for the mange in dogs.

The oil is smeared over a Burman's house from top to bottom, inside and out, with a view to protect it from the attacks of white ants, as a preservative, and for the general dark glossy appearance which it gives as a finish to building materials.

Notwithstanding this general and lavish use of the oil, I have never heard that Petroleum in the slightest degree possesses prophylactic properties of the value mentioned in the papers before me.

Yeanangyoung is situated in Burma proper. The country is high, dry, and perfectly free from vegetation and swamps for miles; whether or not the people employed at the wells suffer from fever I am unable to say. It is more than probable the locality is not a malarious one.

Captain Sladen might be able to collect reliable information on the subject; I would therefore suggest that the papers be forwarded to him with that view.

The original documents are herewith returned as requested.

FROM MAJOR E. B. SLADEN, Political Agent; to MAJOR H. NELSON DAVIES, Secretary to the Chief Commissioner British Burmah, No. 50, British Political Agency Mandalay 22nd May 1869.

SIR,

With reference to your letter No. $\frac{405}{7}$ of the 29th April and a former communication to which it refers No. $\frac{405}{6}$ of 25th November 1868, I have the honor to inform you that it has been no easy task to obtain accurate information in support of the supposed salubrity of Yeanangyoung, (allowing that such salubrity exists) or to determine the causes which operate more or less, in producing that salubrity.

2. Burmese residents of Yeanangyoung whom I have questioned on the subject, appear in the first instance confounded and surprised at the idea of any prevalent or appreciable difference (climatic or otherwise) as applicable to Yeanangyoung, by which its soil, or atmosphere, or petroleum wells, separate it in a sanitary point of view, from other towns of tracts of country in Upper or Lower Burma.

3. But in a matter of this kind, Burmese are not to be depended upon as reliable observers; and as they do not keep life statistics, or record their experiences or observations on natural phenomena, I have failed to meet with that peculiar kind of intelligence amongst those with a Yeanangyoung acquaintance which could throw any light upon the subject now under reference and enquiry.

4. But as the result of recent conversations with a Mr. Aslan, an intelligent European, who has resided several years at Yeanangyoung the following particulars may be relied upon, I think, as having been deduced from accurate observation:

5. In the first place Yeanangyoung itself is pronounced free from epidemics, even when they afflict, with full force, the towns and villages within a few miles of its own immediate vicinity.

6. Cholera is said to be comparatively unknown, and fevers (Typhoid I fancy) and small-pox are moderate, both in amount and intensity as compared with other stations on the Irrawaddy both north and south of Yeanangyoung.

7. For several miles around, the soil is of a sandy arid nature, which is productive only, to any degree, when extensively manured. Vegetation is consequently scant and the ordinary rain-fall of the surrounding country proportionately diminished. This with certain predisposing peculiarities of soil, accounts undoubtedly for certain extremes of heat and cold, which are universally admitted to exist in the vicinity of Yeanangyoung, though unknown or unnoticed in other tracts of country by which it is surrounded. That these extremes do not operate prejudicially to health, is evidenced by a comparative absence of epidemic disease, and by a generally improved sanitary condition as compared with the healthy state of adjacent localities.

8. The people themselves of Yeanangyoung ascribe their comparative immunity from human ailments to a general well-to-do condition, arising out of their profitable connectionship with the oil wells, either as proprietors, speculators, or employés.

9. If we look to the inhabitants of the place for any expression of opinion upon the relationship between the health statistics of Yeanangyoung (locally considered) and the affinity which is supposed to exist between health and Petroleum, we should find, that their verdict, in a sanitary point of view, is opposed to the idea that the oil wells, or that contact with Petroleum itself is conducive to health.

10. On the contrary they believe and tell us, that the labourers employed at the wells are more than ordinarily subject to a species of leprosy : as well as to a form of sore eyes which principally affects the eyelashes.

11. Nevertheless the oil is used medicinally by the Burmese as a vermifuge, and is also applied externally in confirmed cases of itch and rheumatism.

12. Patients too, who suffer from Asthma or other affections of the lungs, are believed to derive special benefit from being lowered down occasionally into an oil well, so as to inhale the gases with which it abounds.

13. Another use to which the wells are put, is that poor people are said to crowd around them during the cold season, and to derive the same amount of relief and warmth near them as they would in the vicinity of a comfortable fire.

14. The only other peculiarity which has been noticed in the life statistics of Yeanangyoung is that there is a remarkable absence of old people, male and female. Such a fact would be anomalous in any town or in any country; and its peculiarity at Yeanangyoung is the more striking on account of the fact, as already alleged, of comparative immunity from cholera and epidemic diseases.

15. In other respects, the peculiarities which have been noticed, belonging to Yeanangyoung, are easily explained, and may readily be solved on scientific principles."

CHOLERA.

The accumulated evidence adduced by Civil Surgeons on the subject of cholera seems, on the whole, to point to the following conclusions: (1) That the disease can, under certain special circumstances, be conveyed by individuals. (2) That it is sometimes thus imported at fairs and religious assemblages. But (3) that, in the large majority of instances, its outbreaks occur at particular seasons of the year, altogether independent of human intercourse; and (4) that its chief points of attack follow in no regular sequence, but seem to be determined, limited, and aggravated by local circumstance, and localized peculiarities. (5). The connection of the disease with the " drying up" of moisture in the soil is frequently noted.

In a few of the reports the general subject has not been taken up at all; in others important observations are communicated.

At *Jessore*, the disease prevailed during the later months of 1867 and the earlier months of 1868. It appeared soon after the cyclone of 1867 (" when the waters of an unusually high inundation were rapidly subsiding ") and disappeared on the occurrence of heavy rain-fall; places situated on large rivers chiefly suffered; " it prevailed very generally over the whole district, breaking out here and there without any apparent rule;" the jail was not visited; the months for cholera at Jessore are March, April, May and also October and November—the visitations in the later months not being so general or so severe as those occurring in the dry, hot season. Dr. McLeod writes: "If April and May are very dry, cholera is apt to acquire great strength, but if a heavy and sustained fall of rain occurs the disease generally abates or disappears. One storm may temporarily check an outbreak, but if not followed by others it is apt to re-appear." " When cholera breaks out in the district it breaks out simultaneously in different places and no line of progress can be traced; generally its conduct is most eccentric—it will attack a portion of a village, a side of a bazaar, a few inmates of a house, and no rule or law can be discovered in its origin or progress. "Hot dry weather with strong, dusty winds, is the most favorable condition of its origin."

Cholera, of a severe type, appeared at Copalmoney fair, although the disease was elsewhere generally mild; it disappeared on the dispersion of the fair.

At *Kishnagur,* the disease "broke out in March and April almost all over the district; in a few villages it was very severe; it appeared simultaneously in three or four different villages widely apart from each other; the outbreak lasted about two months."

At *Berhampore,* cholera generally appears in October or November, "when the sand-banks in the river begin to dry up," and again in March, April and May. The disease is endemic in the district. "It prevailed to a considerable extent in November and December of 1868 among the villages along the Jellinghee and around the Kulluntra *Jheel,* and shortly after appearing there it was reported at villages throughout the district."

At *Furreedpore,* the disease prevailed in November 1867, after the cyclone, and again in March and April; it had ceased by the middle of May. It is said to have been due to fouling of water and also to importation. Dr. Bose, reports that cholera had been prevailing for some time before the cyclone in the adjoining parts of the Jessore District (I do not think this is mentioned by Dr. McLeod.) The first appearance of the disease was about the middle of November, at the town of Syedpore on the Barassia, about 20 miles from the station. It was attributed to overcrowding, filth, and sudden vicissitudes of weather. In March the disease appeared almost simultaneously at several parts of the district, most severely in villages along the river Chandona. *Only one epidemic of cholera is said to have occurred at Furreedpore, during quarter of a century.* That was in 1858, in the jail: This year beyond a few solitary cases in the town the disease did not spread; the visitation lasted ten days; in the Jail twenty-eight prisoners were attacked, eight died; in the Kamroop Regiment, which had just arrived from Gowhatty, about 100 were attacked and between seventy and eighty died.

At *Burrisaul,* cholera is endemic, and is heard of and seen in the district at all seasons *except during the rains.* It usually appears at the commencement and end of the cold weather, chiefly in March and April "when the river is very low and the water of tanks very impure from long drought and the filthy habits of the people." During the last twelve years cholera epidemics have been less frequent than formerly ; yet during 1868 it visited the jail three times, proving fatal in nineteen cases. Dr. Mathew writes : "always when the disease prevails, the sky is over-cast and the atmosphere presents a peculiar hazy appearance." "No virulent epidemics have occurred in the jail since the dry-earth system has been introduced."

At *Dacca*, it is a remarkable fact that from 1834 to 1838, inclusive, cholera prevailed chiefly during the rainy months. "During the last quarter of a century," writes Dr. Wise, "this has not held good ; the disease is now at a minimum in the rains and most prevalent in the dry hot months." During the outbreak at the end of 1867 the disease was observed to prevail with greatest intensity in the Mohullas bordering on the river. Dr. Wise writes : "late rains and a slow subsidence of the inundation postpone the outbreaks of cholera ; an early cessation of rain is followed by an early outbreak of the disease." This exactly corresponds with the experience of Dr. Barnes who was Civil Surgeon of Jessore from 1810 till the end of the year 1822 (with the exception of part of 1816 and 1817). He wrote : "If the rain did not terminate till the end of September, and the floods subsided gradually during the month of October, the autumn season was free from extensive sickness ; but if the rains broke up at the end of August, and the waters sank rapidly during September, the disease commenced its attack among the inhabitants at the beginning of October, carrying death and desolation in its progress until about the middle of December, when the complaint became checked, and in a short time apparently extinct." This was written in 1831, but it refers to Dr. Barnes' previous experiences (*vide* McCulloch and Maclaren on Cholera page 27.) Dr. Wise observes that the disease is most prevalent during the months when there is greatest range of temperature. *Since* 1817 *to* 1868 *the disease has not been absent a single year from the city of Dacca.* April, November, December and March are the worst months, against April, March, May, February and November in Calcutta. Dr. Wise believes that as a rule the disease is not spread from man to man, although under special conditions, as when the poison is concentrated, he believes it may be spread by human intercourse.

At *Mymensing*, during the year under review the disease twice appeared,—in April and May, and during October, November and December ; the outbreak "seemed to have a close relation to polluted water and bad food ; soil did not appear to exercise any influence ; neither did contagion. In the 1st epidemic the difference between the wet and dry bulb thermometers was 15° ; in the 2nd outbreak it was only 4° or 5°.

At *Comillah,* cholera prevailed in February and March; there had been a want of rain in August and September, which caused drying up of tanks and partial loss of crops. The prisoners in the jail were not attacked.

At *Noacolly,* during 1868 only sporadic cases occurred in the station. The last real epidemic visitation happened eight years ago.

At *Kooshtea,* the disease was " due to natural conditions of soil and climate intensified by neglected sanitation, and favored by poverty." It most severely attacked those living on low swampy ground. Slight showers may arrest cholera," says Dr. Grant, but " heavy and constant rain is required to extinguish it." Yet it is to be remembered that in the North-Western Provinces of India the maximum prevalence of the disease is *during the rainy season.* " After the unusual inundation during the rains of 1867" writes Dr. Grant, " as the dry season advanced, sub-soil water rapidly subsided ; at first fevers appeared, and afterwards, as temperature rose (in February, March and April) cholera raged until arrested by heavy and constant showers which begun about the middle of May. The disease could not be traced to importation. The prevailing wind during the epidemic was westerly. The epidemic spread in a north-easterly direction, against the prevailing wind, and in a westerly direction to Nowpara and Dowlutpore, where it terminated about the middle of May after heavy rain."

From *Pubna,* we have no particular information. The disease usually occurs there in April and May, and at the end of the rainy season.

At *Rampore Beauleah,* the disease prevailed in March, April and May ; the first case was on the 17th of March. Pilgrims seemed to bring the disease to the station from Nattore. It seemed to have spontaneous origin in the jail ; it simultaneously attacked different parts of the jail which were not in communication with each other ; it was not found to be personally contagious ; it was not influenced by prevailing wind ; sub-soil water was found ten feet below the ground surface. Dr. French, concluded that the epidemic was due to atmospheric influences. The natives believed that eating new rice and putrid fish had something to say to the prevalence of the malady. In the district, the disease formed a belt without any cases occurring in the centre of the circle.

At *Maldah* the disease appeared in October 1867, coincident with drying up of the Ganges after inundation. It continued until June 1868; it was severe at Kansant (twenty miles south of Maldah) during the last week of March, and at Gajole in April. Two convicts were attacked in the jail in February, one of whom came from Parosah, a place twelve miles north of Maldah, where the disease was prevailing severely. The report says that the disease adheres longest to places where sanitation is most defective.

At *Rungpore,* it is a very remarkable fact that epidemics of cholera seem to be almost unknown. Such is Dr. Bowser's report; but it is to be observed that Dr. Mouat has written as follows on this subject: "The statement that cholera is unknown at Rungpore is incorrect. In 1859, nineteen cases occurred in the jail; in 1860, forty cases; in 1866, twenty one cases. The attacks seem always to have been mild and the decennial mortality rate to have been 0·50 per cent of average strength, if the records be trustworthy, which I am constrained to say, I do not believe them to be." (Letter No. 301 T, to the Officiating Secretary to the Government of Bengal, dated 31st July 1868.)

The northern parts of the *Julpigoree* district are believed to be comparatively exempt from cholera.

At *Darjeeling,* there has been no epidemic since 1864, and that was limited, and entirely confined to the natives.

At *Burdwan,* cholera appeared mildly in April; the first man attacked had arrived from Calcutta. There were nine admissions in jail and no deaths. The disease at this station is generally mild; sporadic cases occur in the hot weather.

No particulars of importance have been received from *Purneah, Cutwa,* or *Bancoorah.*

At *Raneegunge,* the disease appeared in the Bazaar late in February, "imported as usual by pilgrims;" occasional cases occurred during March, April and May. It seemed to cease in the Bazaar during the 2nd half of May, but re-appeared in the beginning of June. It abated from the 16th June and had quite disappeared by the end of the month. There was no cholera in the jail during 1867 or 1868. Dr. Roberts believes this was due to the prisoners using the water of a well situated within the precincts of the prison. Persons using the water of the Raiband tank seemed to Dr. Roberts to suffer in great proportion. This reservoir, according to the reporter, "receives the drainage of an extensive tract of country and especially of a piece of sloping ground made use of as a latrine by the people of the Bazaar." "All tank water," adds Dr. Roberts, is liable to excrementitious pollution, and yet it is usually drunk by the inhabitants and by all travellers,—this when they might have comparatively pure well water. February, March and April are the usual cholera months at Raneegunge. It rarely prevails during the

At *Soory* (Beerbhoom) no cholera cases occurred in the town. One Police Constable died " who had no communication with any infected place or persons." The disease occurred in the district during March, April, May, July, October, November and December; " outbreaks occurred simultaneously in different localities or at short intervals."

At *Rajmehal,* the disease occurred in the middle of April; it prevailed until the end of May and disappeared after heavy rain. Cholera is usual at the station in April, May and June.

No information has been received regarding cholera from *Deoghur* (Sonthal Pergunnahs.)

At *Pooroolia,* the disease occurred on the 9th June in the person of a Police Constable who had come from a distance of forty miles. The outbreak occured when heavy rain fell. The Civil Station, Jail and Police Lines were exempt. Epidemics have increased at Pooroolia since forest trees were indiscriminately cut down.

At *Chyebassa,* no cholera occurred during 1868; there was an epidemic in 1866 (which is described in Dr. Manook's report.)

The localized outbreak which occurred at *Echak,* near *Hazareebagh,* in June, is of great interest.

The particulars will be found embodied in my special remarks on Dr. Delpratt's report. Polluted wells were in close proxmity to the dwellings of those who were attacked by the disease.

At *Bhaugulpore,* cholera usually appears in March or April, and in August. In 1868 it only came in October and November, and in the town it was very slight. There was no April epidemic.

At *Monghyr,* the disease usually appears about the end of March and disappears in May. In 1868 it appeared in April; but it did not attack the prisoners in jail. It has been remarked by Dr. Cameron, that the disease usually appears in the jail and in the native town at different times. In 1866 and 1867, it was in the native town in April; in the jail during July and August. On one occasion when cholera was prevailing in the prison, and nowhere in the adjoining district, persons in out-houses close to the jail (separated from it by a wall) were attacked, whilst there was no communication between those attacked and the prisoners.

At *Gya,* cholera prevails most in July, August, June and May. Dr. Russell's observation is a most important one, that *the disease prevails most when there is least pilgrimage.* It occurred early in June 1868 ; and its appearance was attributed to the half dried condition of the river Phalgu.

At *Patna,* the disease is always endemic, but it has never, during Dr. Hutchinson's tenure of Office, assumed alarming proportions.

At *Moteeharee,* one sporadic case occurred which was not traceable to outside communication.

I have given careful records of the occurrence of cholera in Orissa during the spring of 1868, in my report on pilgrimage to Juggernauth.

At *Balasore,* Dr. Davies, considers that the number of pilgrims attacked somewhat nearly corresponds to the degree of drought prevailing. In one village the disease was epidemic, " independent of all communication with pilgrims." The predisposing causes noted by Dr. Davies, are long-fasting, fatigue, unwholesome and badly cooked food, and exposure to the mid-day sun, and to night-dews.

At *Cuttack* the disease usually prevails from May till August. Pilgrims have been deflected from the station with good results.

At *Pooree,* cholera prevailed during and before the Ruth Jutra festival, but to a less extent than usual.

From the above notes, it may be inferred that two things seem to be requisite for an outbreak of cholera : (a) special localized causes and (b) favorable seasonal conditions. The first seems to be of a more essential character than the 2nd. Drought, over-crowding, and chemical decomposition of excrementitious matter in the soil seem all closely allied to its causation.

I do not presume to determine whether the specific cause of the disease depends on zymotic molecules ; on cells, filamentous fungi, and fructifying spores ; on endophytic parasites ; or on the presence of infecting matter directly generated from the soil. I leave such questions to practised mycologists. The practical point to be ever borne in mind is, that when cholera prevails there, as a rule, is surface-uncleanliness, imperfect drainage, and polluted water supply. These conditions, supplemented by particular meteorological states,—such as high temperature, low electric tension, speedy evaporation, and stagnation of atmosphere, furnish us with the usual attendants of the scourge. What must

always be looked to is removal of fæcal accumulations, improving of water supply, prevention of overcrowding, and the promotion of general surface cleanliness; above all things soil contamniated by sewage-pollution must be cleansed.

Leprosy and Elephantiasis.

The following is a tabulated statement showing the comparative frequency of Leprosy and Elephantiasis at different stations :—

Howrah.—Both rare.
Hooghly.—Leprosy not common. Elephantiasis common.
Jessore.—Both comparatively rare.
Kishnagur—Leprosy most common among Mahomedans, elephantiasis rare.
Berhampore.—Leprosy not common. Elephantiasis very common.
Burrisaul.—Neither common.
Mymensing.—Both common.
Tipperah.—Both common.
Noacolly.—Both common.
Kooshtea.—Leprosy not uncommon ; elephantiasis comparatively rare.
Furreedpore.—Both extremely rare.
Patna.—Neither so common as in many other parts of Bengal.
Rampore Beauleah.—Both rare.
Maldah.—Both rare.
Rungpore.—Both rare.
Julpigoree.—Neither common.
Burdwan.—Neither very common.
Bancoorah.—Leprosy common ; elephantiasis occasionally met with.
Raneegunge.—Neither of them so common as in the plains lower down.
Beerbhoom.—Both indigenous to the district, chiefly amongst the indigent classes, more particularly towards the hill jungle tracts.
Rajmehal.—Neither common. Leprosy occasional amongst the hill tribes.
Deoghur.—Both common.
Bhaugulpore.—Leprosy somewhat common—about 5 per 1000 ; elephantiasis very rare.
Gya.—Leprosy in all its phases is common ; elephantiasis common.
Patna.—" Neither common ; elephantiasis indigenous." (*sic.*)
Tirhoot.—Neither very common.
Chumparun.—Leprosy and elephantiasis both very rare.
Poorootia.—Both common.
Chyebassa.—Neither common.
Hazareebagh.—Both rare.

Midnapore.—Leprosy not so common as in other districts ; elephantiasis common.

Balasore.—Leprosy seen amongst pilgrims from the North-West ; elephantiasis very common near the sea coast low lands ; not on the hills.

Cuttack.—Leprosy not uncommon ; elephantiasis very prevalent.

Pooree.—Leprosy and elephantiasis both very common.

Where Leprosy is very common much may be done by local Officers for the relief and comfort of the unfortunates afflicted with the disease. They should be well-housed, well-fed, and kept apart as much as possible; and protected from beggary, vicissitudes of season, malaria, and all depressing influences. When attention is paid to personal cleanliness, suitable clothing, pure air, generous diet and the like, it is certain that very considerable improvement in the physical and moral condition of lepers takes place. This fact should be impressed by the Government on District Officers. Where it is possible small *lazarets* or asylums should be instituted, where general Sanitary arrangements should be carefully carried out. There are too few of such institutions throughout Bengal.

It is to be remarked that the ordinary œdematous swelling of the leg, known in the Bengal Districts under the name "*jolodosh*", (Elephantiasis Arabica ; " Barbadoes or Cochin leg" ; the " Rose" of the West Indies) has sometimes been regarded as a distinct variety of Leprosy ; but the accuracy of such a classification is *very* questionable. The two diseases are different in their specific nature ; and it is only the subjects of genuine tubercular and anæsthetic leprosy that should be induced to seclude themselves, as much as possible, from the outer world. When un-cared for, their disease advances rapidly, and probably is, under certain circumstances, a source of danger to those who are well.

Vaccination.

Dr. T. E. Charles, Superintendent-General of vaccination, in his Report recently published, has given the following succinct outline of the past recorded history of vaccination in Calcutta and its suburbs:

" Since 1816 there has been a Superintendent-General of Vaccination at the Presidency whose duties consisted in supervising vaccination in Calcutta and in keeping up and forwarding to different parts of India a supply of vaccine lymph.

Before that date the Officer who discharged these duties had a more extended sphere under his control, and seems to have exercised some sort of general superintendence over the whole of the vaccination taking place in the Bengal Presidency, including districts now under the Government of the North-Western Provinces.

No annual report seems ever to have been furnished before, and hence the present one has been called the first annual report.

Reports other than annual ones have been published from time to time. As early as 1805 the Government published a report written in 1804 by Dr. Shoolbred, from which it seems that 1,426 successful vaccinations took place in that year in Calcutta.

A report by Dr. Cameron was published "On Vaccination in Bengal in 1829.

Dr. Duncan Stewart's report on small-pox in Calcutta and vaccination in Bengal bears the date of 1844, and in 1850 Dr. Stewart, as Secretary to the Small-pox Commissioners, wrote their report.

In the supplement to the *Calcutta Gazette* of the 17th January 1866, is published a "Special Report on the Presidency Vaccine Establishment, Calcutta 1865." In addition to this report, I also addressed to the Government a "Second Special Report on the Presidency Vaccine Department, 1867." This report has never been published, and on its recommendations, which supported those contained in the previous report for an increased and remodelled establishment, the present arrangements have been sanctioned.

In the following year a report was called for by the head of the Medical Department to enable him to report fully on the present state of vaccination in Bengal. The information was furnished under the title of "Third Special Report on the Presidency Vaccine Department." This was published along with a report by Dr. Green, "on Vaccination Proceedings throughout the Government of Bengal Proper, 1868."

The following statement shows the amount of Vaccination and the proportion of success which has been attained during the past year in Calcutta and the Suburbs:

"During the year from May to April inclusive, three thousand, nine hundred and fourteen persons, residents of Calcutta, have been vaccinated, exclusive of cases of re-vaccination and cases in which the result was not ascertained. Of these 3,644 cases have proved successful,—the percentage of success here arrived at being 98·40. In the suburbs, excluding in the same way cases in which the result was not ascertained and re-vaccination cases, 5,927 persons were vaccinated among the resident population, with a result of 5,812 successful vaccinations. Here the percentage of success has been 98·05."

The total number vaccinated in the three Metropolitan circles is thus reported :

" During the past season 1,28,589 persons have been reported as having been vaccinated. Of this number 1,07,140 have been inspected by the Superintendents of Vaccination; thus 83·31 per cent of all the cases vaccinated have not only been seen by a medical man, but have been verified as having been genuine and not spurious vaccinations.

The cost of each inspected case was Rs. 0-4-1."

An interesting feature in the general progress of vaccination in Bengal consists in the fact, dwelt on by Dr. Charles in his Report, of the Pundits at Nuddea having lately countenanced and accepted the prophylactic. The scruples of the people will yield much more readily than heretofore when their religious advisers practically acknowledge and enjoy the benefits of preventive medicine.

Prevention of Contagious Disease.

At the recommendation of the Sanitary Commission for Bengal, embodied in letter No. 19, dated 21st March 1864, Act XXII of 1864, was so framed as to empower the Government to exercise necessary sanitary control against the spread of Venereal disease. Under clause 7, Section XIX of the Act ; Rules and Regulations have been framed for the control of houses of ill fame, for the registration of public women, for the detection of disease, for the guarding of public health against the spread of enthetic maladies, and for the establishment of Lock Hospitals in Military Cantonments.

The working of such Lock Hospitals in Bengal cannot as yet be said to be satisfactory. Such a result could not at first be reasonally expected. The difficulties are many, and they will only be overcome by continued perseverance, by the exercise of patience and good judgment, and by careful study of the weak points of the system.

The general outline of the present system is as follows : all persons " by habit and repute" following prostitution must register before the Cantonment Magistrate; they are subject to weekly or to bi-monthly examinations; if free from disease the fact is recorded on the ticket; if diseased the woman is detained for treatment; the names of registered women not presenting themselves for examination are sent to the Magistrate; women in hospital are fed and treated at Government expense.

The following are the principal objections that have been raised to the present system :

1st. It is said that Registration is a mere farce, and that a very small proportion of public women do register.

2nd. The fee of 8 annas a month levied from each prostitute is said to be more than many women can afford to pay. (In the case of Berhampore where only 15 Rs. were levied during a year, registration fees have been remitted, as an experiment, for one year.)

3rd. Women try to avoid registration by declaring that they are "in keeping".

4th. Criminal prosecution of prostitutes is surrounded by difficulties: the sympathies of the native community are sometimes on their side; bazaar witnesses side with them; vakeels are always ready to defend them in Court.

5th. The women greatly object to periodical examinations and to compulsory attendance at Hospital.

6th. Soldiers are infected by women who are not regular prostitutes, such as female coolies in the employ of the D. P. W, casual beggars, and the like.

7th. Surreptitious prostitution is practised in spite of existing rules and regulations.

There can be no doubt that all these objections are more or less weighty. Great firmness will be necessary on the part of Civil Officers in improving registration; monthly registration payments must be regularly realized, under Rule 12; regular attendance for medical examination must be strictly enforced under Rules 15 and 29; surreptitious practices must be exposed by the Police; beggars, vagrants and unregistered public women must be kept at a distance by the Military Authorities; where it can be carried out without difficulty, a periodical examination of European Soldiers should be made, each man being seen *separately* by the Surgeon; the men should be induced, as far as it is possible, to declare by whom they have been infected. Local improvements and alterations in existing Lock Hospitals will in some cases be necessary. Withal, difficult as the subject is, it is to be hoped that it will be pushed on to really useful ends; with this object the co-operative zeal of Magistrates, Civil Surgeons and the Police is essentially necessary.

The following are some of the leading statistical facts taken from the Reports of the Lock Hospitals of the Lower Provinces.

The *Berhampore* hospital can accommodate 12 patients.

" The average number of prostitutes registered during the year was only 5·4 and this in a place where prostitutes abound."

The maximum registered in any month was	..	7.		
The greatest number treated during any month	..	9.		
The total number treated during the year ..	..	57.		
The greatest average monthly number treated	=	4·30		
The total expenses of the institution ..	=	1120	2	6.
The receipts	=	15	3	3.
Giving an annual cost per each women of Rs.	..	19	0	4.

Dinapore Lock Hospital, opened 1*st January* 1867.

		Rs.	As.	P.
Total annual cost	=	2,105	6	8
Receipts	=	570	6	3
Average number registered in the year	=	94		
Maximum registered in any month ..	=	110		
Greatest number treated in any month ..	=	19		
Total number treated in the year ..	=	102		
Daily average number of sick ..	=	20		

Dum-Dum, established 1*st December* 1867.

Annual cost	=	1,601	3	1¼
Total receipts	=	74	0	0
Average annual number registered ..	=	33		
Maximum in January ..	=	34		
Minimum in December ..	=	31		
Greatest number treated in any month ..	=	15		
Total number treated in the year ..	=	74		
Average number of sick ..	=	3·14		

Barrackpore, opened in November 1867.

Annual cost	=	1,032	0	0
Receipts	=	168	0	0
Average annual number registered ..	=	51·16		
Minimum, in January ..	=	46		
Maximum in December ..	=	61		
Greatest number treated in any month ..	=	196, in December.		
Total number treated in the year ..	=	1614		
Average number of sick ..	=	4·55		

Hazareebaugh, opened on 1*st April* 1867, *capable of accommodating fourteen patients ;—women examined every Monday morning.*

Annual cost		1,108	10	10
Receipts		103	11	3
Average annual number registered		9·58		
Minimum, in January		6		
Maximum, in November		12		
Greatest number treated in any month		6 in August.		
Admissions during the year		24		
Average number of sick in Hospital	=	1·27		

Darjeeling, opened on 1*st January* 1867.

Annual cost	=	300	6	3
Receipts	=	70	0	0
Average annual number registered	=	13·08		
Minimum, in November	=	12		
Maximum, in July	=	14		
Greatest number treated in any month	=	5		
Total number treated in the year	=	17		
Average number of sick in Hospital	=	52		

Chinsurah.

Annual cost	=	1,038	9	9
Receipts	=	52	9	0
Annual average number Registered	=	11·13		
In 1867 the average number registered was	=	52		
Maximum, in January	=	12·58		
Minimum, in December	=	11		
Greatest number treated in any month	=	4 in September.		
Total number treated in the year	=	22		
Average number of sick	=	1·14		

From the above, it will be seen that the present system has, as yet, proved a failure at Chinsurah and Dum-Dum, whilst no very marked results have been obtained at Barrackpore. The reports from each of these places, however, affords a certain clue to the want of success. At Chinsurah only women frequented by the European soldiers were registered; at Dum-Dum the rules were not properly enforced ; at Barrackpore an extension of the Act is required.

In spite of failures, however, there are certain notably favorable points in the reports. Dr. Thompson at Hooghly (Chinsurah) reports that "women do now, willingly and of their own accord, resort to the hospital when sick." Dr. Simpson, remarks that " the number of venereal cases treated in the Jullapahar Hospital have considerably decreased since the establishment of the Lock Hospital and a system of bi-monthly examination; even better results may be looked for when the plan of registration is more strictly carried out." Dr. Delpratt at Hazareebagh declares that the public women have attended weekly inspections "without complaint, and with fair regularity"; and Colonel Dalton alludes to "the successful management of the Institution under the charge of Dr. Delpratt." Perhaps the most favorable results have been attained at Dinapore. The Assistant Surgeon in charge, Dr. Clapp, reports that one proof "that the women are beginning to appreciate the benefit of the hospital is that they now frequently present themselves for admission when they find they are diseased. The number of absentees also every month grows less; notwithstanding the unfavorable situation as regards Bazar, &c., of Dinapore, there is a steady, though gradual, improvement in the health of the European troops in the station.

Effect on the health of European Troops.

Table shewing total admissions for primary venereal affections among European troops.

	Year	*Royal Artillery*	105*th L. I.*	*Total.*
	1866	82	327	409
Lock Hospital open.—	1867	52	188	240
	1868	54	189	243

This table, I think, shows in a most satisfactory manner that there is a marked improvement in the health of the men since the introduction of the Lock Hospital at Dinapore, January 1867, and that the decrease in the number of admissions in 1867 was not a mere casual occurrence. Of the 54 admissions in the Royal Artillery, only 26, or not one-half, were for primary syphilis and gonorrhœa, the remainder were caused by secondary syphilis, &c. and many of these admissions were caused by the same men being admitted several times; at the same time there can be no doubt that there is still a very high proportion of men diseased, and this disease is contracted, as I have before stated, from unregistered women who live around the station, and until the Police contrive to find these, and have them properly examined, the disease will never be properly checked. In this duty they might be materially helped by Medical Officers of Corps, who should compel all men who come to hospital to point out the women from whom they contracted the disease."

"*Remarks on attached table &c.*—The table attached shews that although the number of women on the register is gradually increasing, the number found diseased is each month growing less. This is due, I think, to the women being more cleanly in their habits than they used to be.

" In conclusion, I think that every year there will be an improvement in the health of the station, as the women are beginning to find out that it is to their own advantage to keep themselves clean and free from disease, and to present themselves for treatment when found diseased."

In time we may fairly hope to see a diminution of enthetic disease in every station where the Lock Hospital system is carefully carried out.

It is a matter worthy of special remark that, after long correspondence with the Marine and Medical Departments, and with the Chairman of the Justices of the Peace, the Government has passed Act No. XIV of 1868—the *Indian Contagious Diseases Act.*

It has been drafted very much after the plan of the corresponding English Act of 1866, and it now applies to Calcutta and the Suburbs. It is to be worked under the able Superintendence of Dr. Payne. This act provides for compulsory registration, medical examination, and detention of sick in hospital. If experience proves that it can be worked properly we may expect a great decrease in the amount of syphilitic disease affecting both soldiers and seamen in Calcutta.

Regarding Scurvy, and the new Indian Shipping Bill.

Her Majesty's Transport " *Czarewitch,*" from Abyssinia, arrived in the port of Calcutta in the beginning of May, with all the native portion of the crew suffering more or less from scurvy. Dr. S. Coull Mackenzie, then Assistant Surgeon in the Presidency General Hospital, received orders to report on the subject. He found fifteen or twenty of the crew much emaciated and unfit for duty. These men were ordered to the Medical College Hospital for care and treatment. The vessel was found to be clean, and the ventilation in the forecastle and between decks was excellent. Dr. Mackenzie, continues his report thus :—" There was plenty of lime juice and good distilled water on board, I am of opinion that the cause of the disease amongst the native crew may be ascribed to the nature of their food during the last six months, *i. e.,* since the vessel sailed from this port.

The allowance of food to each man per diem was as follows :—

Chillies	½ Ounce.
Garlic	½ „
Turmeric	½ „
Salt	1 „
Ghee	2 „
Dholl	4 „
Rice	2 lbs.

7. "The only other food these men have had during the voyage has been some salt-fish, which they bought at Annesley Bay, some vegetables which they took with them from Calcutta, and some they got when the ship called at Aden; both supplies of vegetables I believe did not serve them more than a couple of weeks.

8. From the above it will be evident that although the quantity of the food has been quite sufficient yet the quantity of antiscorbutics, namely the ½ oz of garlic *per diem* and the few vegetables mentioned above, has been quite inadequate for a long and trying voyage.

9. Lime juice was supplied to the men, but they would only take it when forced to do so. It is to be regretted that they were not mustered every day and made to take the regulation allowance in presence of one of the European officers.

10. The European officers of the ship I found to be quite free from scorbutic symptoms. They have had vegetables nearly throughout the voyage and have partaken largely of the lime-juice.

11. I would beg respectfully to recommend that Government should in future supply all their ships, carrying lascar crews going on long voyages, with plenty of onions, pumpkins, and preserved tamarind; these antiscorbutics are much liked by natives and they would most gladly partake of them.

12. In conclusion I would suggest that Government should immediately send a Telegram to Abyssinia to inform the Commanders of vessels of the disaster which has befallen the Crew of the *Czarewitch* and to instruct them to have daily inspections of their men to compel them to take their regulation allowance of Lime-juce or other antiscorbutics."

A warning was accordingly telegraphed to Abyssinia. The drinking water on board the *Czarewitch* was at my request, analyzed by Dr. F. Macnamara. It was found to be wholesome, and contained "only 11 2 grains to the gallon of solid matters, including 1·4 of volatile (organic?) matter."

It is to be hoped that instances of ships with scurvy on board will now become less frequent. The Government has of late done much for the health and comfort of the sailors in the Port of Calcutta. The new Indian Shipping Bill came into operation from the 1st of December 1868. By it "the law relating to Merchant ships, seamen and Passengers by sea" is amended. Chapter VI of the Bill relates to the "provisions, health and accommodation of seamen." Fourteen Sections are devoted to this subject. On reasonable complaint being made, a careful survey of provisions and water is to be instituted ; " all such provisions and water as are of bad quality and unfit for use, shall be destroyed or discharged from the ship," under a penalty not exceeding two hundred rupees. By way of compensation, allowance is made for short or bad provisions; a proper supply of medicines and medical stores is enforced. Lime and Lemon juice must be carefully inspected by an officer appointed by the Governor General in Council, who shall, in all cases, give a certificate as to its quality. It must be mixed with 15 per cent of " proper and palatable proof spirits," and it must be carefully packed and labelled. It is to be served out daily, with sugar, at the rate of *one ounce* daily to each of the crew; and this not later than ten days after the ship leaves port. The name of any seamen or apprentice refusing to take the same shall be entered in the official log-book. Proper weights and measures must be kept on board. The expense of medical attendance and subsistance in case of illness of any person in the service of the ship is provided for. Every foreign-going ship, having one hundred persons or upwards on board, must carry a Surgeon or qualified medical practitioner. Each European seaman must have *twelve* superficial feet of space " if the place be not less then six feet in height from deck to deck or *seventy-two* cubic feet, if the height from deck to deck be less then six feet. Each lascar or native seaman shall have *nine* superficial feet, or if the place be less than six feet in height from deck to deck, *fifty-four* cubic feet. Every such place must be securely constructed and properly lighted, ventilated, and protected from weather and sea, and duly guarded from the effluvium of bilge water. It must be duly " certified to accommodate a given number of seamen," according to the above standard.

The space must be kept free from stores or goods of any sort, otherwise it shall not be deducted from the register tonnage of the ship, and the master shall incur penalties and forfeits. A Medical Inspector, appointed by the Local Government, " shall, on application by the owner or master of any ship, examine any seaman applying for employment in such ship, and shall give to the Superintendent of the Mercantile Marine Office, a report under his hand stating whether such seaman is in a fit state for duty at sea, and copy of such report shall be given to the master or owner of the ship."

The Superintendent of Mercantile Marine, may at any time inspect the provisions, water, medicines, appliances and accommodation of any ship having seamen on board. At sea, record must be kept in the official log of every case of illness or injury happening to any number of the crew, with the nature thereof and the medical treatment adopted (if any)" (vide chapter X Section 225.)

With reference to Native passengers, every vessel carrying such must be certified, and must carry a sufficient quantity of water and provisions. The space allowed to each passenger (above twelve years of age) must equal at least *ten* superficial and *seventy-two* cubic feet; (vide chapter I part VI. Section 274.)

The most important provision of the new Bill is the appointment of a Medical Inspector or Protector of seamen in the port. Dr. Shircore has lately been nominated to the appointment. The proper performance of his duties will require much care and attention. It is to be hoped that now every ship in the Port of Calcutta will have its provisions, water, medical stores, lime juice, accommodation, and ventilation carefully inspected and reported on. The fact of the lime juice being mixed with 15 *per cent* of spirits will, with tolerable certainty, ensure its being accepted by all British seamen. It should periodically be subjected to careful chemical analysis. All perniciously adulterated stores should at once be rejected, and penalties inflicted both on the owners or master of the ship and on the vendors. It is questionable whether the provisions of the Act as regards superficial and cubic space are liberal enough. It will be the more necessary to exercise rigid supervision under this head. In the "Lancet" Reports on the present Sanitary condition of the Mercantile Marine, the allowance of cubic space recommended, for each adult, was *ninety* feet, with *fifteen* superficial area. The same allowance was recommended by Mr. Leach, the Resident Medical Officer of the Hospital ship "Dreadnought," and by Captain Henry Toynbee,—for long, well known in the Port of Calcutta. The Port Medical Inspector should see every ship *entering* as well as leaving the port. It is to be hoped that now the average number of seamen in the Port and the exact rate of mortality prevailing will be carefully determined. A system should be enforced whereby every case of cholera should at once be reported. A few years ago the average death rate of sailors in the Port of Calcutta was found to be 96·48 per 1,000 (Chevers); and, during ten years, 76 in every 100 persons who died of cholera in Calcutta were also sailors (H. Macpherson.) With more careful and systematic inspection, we may hope to see such terrible figures greatly modified. The preparation of simple sanitary rules for the guidance of Captains and Crews whilst in port might be found useful. The Port Medical Inspector will do well to persuade, as far as lies in his power, Captains of ships to have water boiled as well as filtered. The use of permanganate of potash might be systematically carried out without the slighest difficulty; and for a very small sum a simple distilling apparatus can now be had, made of block tin. Masters of ships ought also to be induced to carry fresh preserved meats and vegetables on board for occasional distribution; pickles, potatoes, onions, carrots, molasses and the like being more particularly useful in this respect.

We may reasonably expect that much good will come of the appointment of a Port Medical Inspector. Sailors have now their "Calcutta Home" to go to. Indeed this noble institution is very popular; good housing, good food, cheap and wholesome liquors, cleanliness and ventilation being all secured, it is scarcely to be wondered at that the majority of men prefer the Home to the bad air, bad food, bad company, and poisonous liquors of the small bazaar lodging-houses and drinking booths. Thanks to the efforts of many humane citizens, and to the assistance afforded by the Government, the prospects of the British sailor in Calcutta are improving. He is systematically looked after and cared for. He has a good, clean, comfortable "home" to go to. He is there treated like a rational being. He has a fine play-ground provided for him; he is kept as much as possible out of the way of temptation; and when sickness befalls him, he commands the assistance, advice and sympathy of most talented professional men. If experience does not ere long clearly prove that cholera, dysentery and sunstroke are greatly less prevalent than formerly amongst sailors in Calcutta, I shall be greatly disappointed. It will be in part the duty of the Port Medical Inspector to bring such good results about, and to record them.

Quarantine.

I have written so fully on the subject of Quarantine in my Orissa report, which is with the Government, that it seems unnecessary to dwell on the subject at present. It is possible that the isolation of individuals may at times be advisable and beneficial in Jails and other well-defined establishments of the sort; but I am altogether and most strongly opposed to the establishment of Inland Quarantine, as applicable to pilgrims, or large bodies of independent travellers.

The question as to what degree Quarantine could or ought to be enforced in the port of Calcutta, has of late been urged on the Government of this country, chiefly I believe by the Egyptian and Ottoman Governments. The subject is still under consideration, and it will in due time be dwelt on in the report for the current year.

Epizootics.

The reports of Civil Surgeons show that Epizootics are by no means uncommon in the Bengal Districts. During some years they prevail to a great degree. By the loss of their cattle the poorer classes suffer much hardship. A question however, of still greater sanitary importance is to determine if in any way the human race is liable to be affected by diseased cattle. Fortunately the co-relation between Rinderpest and any specific idiopathic disease in man has not been established. Yet the observation has frequently been made that Epizootics prevail chiefly during the periods when man is subject to Epidemic influences. This is more than once noted by Macculloch. Again in 1817, when cholera was raging, a great mortality occured amongst horned cattle throughout Upper India;—"Their bodies could be seen strewed in vast numbers in the pastures, by passing travellers." (Jameson. p. XLVIII); "great numbers of horned cattle and sheep" writes Corbyn (p. 160) "were seized with vomiting and convulsions, and suddenly expired. In 1815, again, half the cattle of the lower part of Tipperah were carried off by a disease similar to cholera. In Delhi dogs died rapidly. In the Jeypore and Nagpore territories, the season was remarkably fatal to camels. At Sumbulpore, an elephant had every symptom of cholera."

These notes are of particular interest in connection with certain observations which have lately been reported from Assam and Chota-Nagpore.

There is a reason for believing that a contagious eruptive affection (Aphtha Epizootica) may be contracted from animals suffering from vesicular murrain; carbuncular typhus has been known to be similarly communicated to man. The milk of diseased cows is known to give rise to gastro-enteritis. It is of much importance, that high rates of mortality from any epizootic should be compared with the prevalence and fatality of any epidemic disease liable to affect man. Any possible connection between the dissemination of murrain and the propagation and spread of cholera should be more particularly looked for. The relation between "*gootee*" and true "vaccine" also requires to be most carefully determined. The question whether cow-pox is ever seen as a natural disease in India is one of much interest; also whether cow-pox can, under any circumstances, be propagated to man by any idiopathic cattle plague in India. Is man in any way, even indirectly, liable to be infected from the ordinary murrains which prevail in this country? This is a question of deep interest which still demands the closest scrutiny.